

Archives of
PHYSICAL MEDICINE
and **REHABILITATION**

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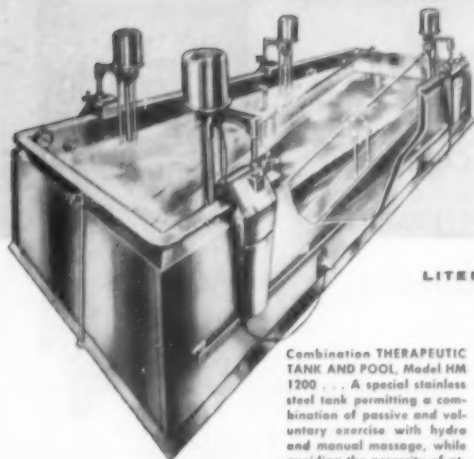
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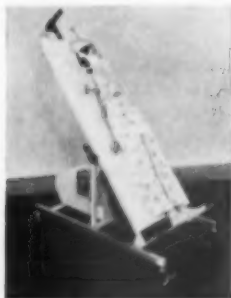


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Serendipity

(Apologies to Horace Walpole)

William D. Paul, M.D.
Iowa City

Before proceeding with the substance of my address, I want to express my sincere thanks for the honor and privilege of being entrusted with the guidance of the affairs of the Congress for the past year. I am profoundly grateful.

In my role as president, I have the honor to address the members and guests of this organization. I am not wise enough to bring you the philosophies of the ages, nor am I old enough to assume the role of an elder statesman. My present chief, Dr. William Bennett Bean, in a recent presidential address stated, "It is the immemorial custom of societies such as ours to hold an annual clambake; and the president is expected to invoke his prerogative of perpetrating an address." Shakespeare, who has supplied us with a proper quotation for all occasions, has not forgotten one for the presidential address. In the epilogue to the second part of the play "Henry IV," an unnamed dancer speaks the following: "First, my fear; then, my court'sy; last, my speech. My fear is, your displeasure; my court'sy my duty; and my speech, to beg your pardons. If you look for a good speech now you undo me!"

In 1798, President Wheelock of Dartmouth College, uttered a famous prayer which ran, "O Lord, we thank Thee for the Oxygen gas; we thank Thee for the Hydrogen gas; and for all the gases. We thank Thee for the Cerebrum; we thank Thee for the Cerebellum; and for the Medulla Oblongata. Amen." We could bring this prayer up to date by adding, "O Lord, we thank Thee for the radiologist, the anesthetist, the physiatrist, as well as the amides and the mycins."

Physical Medicine and Rehabilitation has recently taken its place with the other branches of medicine as an important facet in the healing art. We have

departments of physical medicine and rehabilitation in most medical schools, residency programs in the teaching hospitals, as well as a Specialty Board. Having come of age, it is pertinent for us to take our foot off the accelerator, apply the brakes gently, and as we move slowly but steadily forward, to read the sign posts so that we can follow a proper course. With events moving so swiftly by us, it would appear at times, as if we were standing still — even moving backwards. These swiftly moving events represent the passing of an era, the so-called "Age of Infections." For the first time in the history of man, we have an opportunity to observe how a normal human being goes through life subjected only to stresses and strains of normal living. Now that infectious diseases are either conquered or held in abeyance, we can observe the natural history of injuries, of aging, and of the processes called degeneration. It is in this new era that the physiatrist will play a major role in the art of healing. As we proceed along the road, slow enough to read the signposts, our attention is continuously diverted by large signs marked, "short cuts." These signs are usually very large, often lighted by neon tubes, or animated with flashing bulbs, having arrows pointing to by-passes. These signs read, "to Biochem. Lab., to X-Ray, to E.K.G., to E.E.G., to E.M.G.," etc. These short cuts are inviting, but unfortunately confuse our direction, delay our progress and may even end in blind alleys. The main highway may be narrow, rutted, bumpy, not too well lighted, but will lead us, if

Presidential Address: Read at the Thirty-third Annual Session of the American Congress of Physical Medicine and Rehabilitation, Detroit, August 30, 1955.

From the Division of Physical Medicine and Rehabilitation, University of Iowa, College of Medicine.

we drive carefully, to the goal we charted.

To keep our specialty in the forefront of the healing art, the physiatrist must be well equipped in many phases of medicine. The most important function in which he must be trained is diagnosis. More than two centuries ago Albertini (1672-1733) wrote: "I know from long, careful observation and training in post-mortem examinations, that diagnosis is that part of the healing art in which most failures are made." It is in this phase of his art that the physiatrist comes closest to understanding and evaluating human nature. The physiatrist must be versed in internal medicine, neurology, rheumatology, angiology and many other "ologies," not the least of which is psychology. The rudiments of physical diagnosis are taught us first in medical school, but to be truly proficient in this subject one must practice and study continuously.

Treatment in the field of physical medicine and rehabilitation differs from treatment in other specialties. In internal medicine, drugs are used that either have withstood the test of time or have recently emerged from a pharmacology laboratory. The new drugs have first been conceived by the organic chemist; screened by the pharmacologist; tested by the physiologist and biochemist; then tried by the clinical investigator; searched for gimmicks by the advertising men; scowled at by the sales force; scrutinized for profits by the executive board, and then sent to the Food and Drug Administration for approval. An approved drug is then returned to the patent lawyer to conjure and register a new name. Then via the manufacturing chemist, the tablet maker, the packaging expert, it finally comes as a sample into the hands of the internist. The internist is told that the drug is to be used in a definite dose for a certain condition, and is acquainted with its good results as well as its side effects. In physical medicine and rehabilitation we have no specific remedies that have passed through a long chain of study before being placed in the hands of the physiatrist. To maintain our status in the

healing art, it behooves us to study the treatments or modalities we use, to assess their values so that we can properly treat those who seek our help. It was Jonathan Swift who wrote in *Gulliver's Travels*, "A man may be allowed to keep poisons in his closet, but not to vend them about for cordials."

As we drive slowly toward our goal a faint glimmer is seen in the distance. This glow leads us along the narrow road of increasing knowledge. This we learn denotes inquisitiveness, often mislabeled research. To the artisan it means work and vigilance, observing changes, recording events, reading the works of others and then calmly watching the passage of time.

At the present time, research conjures in the minds of most people a vast room filled with tables, glassware, bottles, machines with many buttons, computing devices, retorts, whirling machines, tape recorders and so on. How many of us remember that Robert Koch, without the aid of stains, Wistar Mice or electronic apparatus, kept a microscope on the kitchen table and by spending hours examining sputum, discovered the tubercle bacillus. At present, one hears that research cannot be carried out unless a huge sum of monies is obtained to support the study. Charles Steinmetz while still a young man barely earned enough to rent a poorly furnished room near Cooper Union, in New York City. With only pencil and paper he developed the law of hysteresis which enabled man to harness and transmit electric power. If I or many of you were to be given all the gold buried at Fort Knox and several lifetimes to work in, we would never develop a law of hysteresis, but probably only attacks of hysteria.

Is it necessary to have elaborate apparatus to gain a little knowledge? Sir Thomas Lewis taught that when a dog's heart was stimulated a certain deflection occurred in the electrocardiogram. These observations were generally accepted in the interpretation of human electrocardiograms, until it was shown by Barker that on stimulation of the human heart, deflections were produced which were

opposite in character to those obtained in the dog. This paradox was baffling and many research workers performed elaborate experiments to prove that either Lewis or Barker was correct. Kountz and Prinzmetal in a paper of less than 500 words gave us the correct answer. They placed electrodes on the dog's heart and when the dog was on its back, with the heart against the spine, they were able to confirm the observations of Lewis. By inverting the dog, which allowed the heart to return to its normal position, complete reversal of the deflections were obtained, confirming the results of Barker. This simple experiment of standing a dog on its legs before the electrocardiogram was taken resolved the paradox and resulted in a revision of all the textbooks on heart disease.

This type of research is simple, straightforward, and readily understood. Another type of research is the kind that is complicated, difficult to comprehend and often meaningless. With the present state of scientific knowledge, machines can be built to carry out all types of functions. It has been estimated that there are 10,000,000,000 neurones in the human brain. The first computing machines built at Princeton University contained only 20,000 tubes or valves. If a computing machine were to be built that contained the tubes and wiring, equivalent to the number of neurones in the brain, it would require a building the size of the Empire State Building to house it and the complete electrical output of Niagara Falls to run it. An ingenious research worker could easily build an animal such as a duck. By means of electric motors, thermo-couples, radio tubes, transistors, photo-electric cells, sound receptors, transducers, electrical resistances variable to moisture, it should be possible to construct such an animal. It could quack, walk, flap its wings, and by its movements, show its dislike to loud noises, bright lights, cold or damp. It would move toward or away from such stimuli to which its receptors were capable of response. If exhibited, such a duck would attract crowds, but if while the curious were watching, a duck walked

by, it would require only a few seconds for it to find the automaton a puzzling companion and a disappointing mate.

Before attempting any investigative work, whether it be clinical or basic research, it is necessary to delve into the literature and acquaint oneself with what others have thought or found. Unfortunately, too many authors and research workers are satisfied to read a recent publication and accept both the conclusions and the sources quoted as being correct. Often an article is misquoted, a bibliography misprinted, and these mistakes are perpetuated from then on. We forget the admonition of Francis Bacon, who in his "Essaye of Studies" wrote: "Some bookes are to be tasted, others to be swallowed, and some few to be chewed and digested." Many years ago I had the occasion to check into the literature on the subject of diabetes mellitus. I found that every textbook and article quoted the work of v. Mering and Minkowski. In 1889 these men extirpated the pancreas from dogs and found sugar appearing in the urine shortly after the operation. This momentous work was quoted by physicians throughout the world and v. Mering and Minkowski became famous. Before the close of the nineteenth century, papers appeared trying to prove which of the two authors, v. Mering or Minkowski, was the first to have the idea of removing the pancreas. At the present, we are no longer interested in the argument of who initiated the experiments. Credit is given to both. And the work of v. Mering and Minkowski is quoted in every physiology text, every textbook of internal medicine, and every article on diabetes.

In attempting to locate the original article of v. Mering and Minkowski, I searched through the Surgeon-Generals' Index. Looking under the heading diabetes, it was simple to find. But to my surprise another article was listed, entitled, "Il diabete zuccherino sperimentalmente ottenuto in animali in conseguenze dell' ablazione del pancreas." This article was written by Dr. N. DeDominicus and published in the *Boll. d. r. Accad. Med-Chir. de Napoli*, two

months before the article of v. Mering and Minkowski. One might think that this article, being published in an Italian journal, was not available to the rest of the scientific world. However, his work was known, as he was asked to publish another paper on the same subject in the *Munchener Medicinische Wochenschrift*, a journal that was read throughout the world. DeDominicus published the paper under the title, "Noch einmal ueber Diabetes Pancreaticus," or, "once again pancreatic diabetes," and it appeared on October 13, 1891. A footnote to this paper states that the original work was carried out in February and March of 1888 and was presented as a thesis in April, 1888. With all this evidence available, the name of DeDominicus is still missing from all our literature on diabetes. How many such oversights have occurred in medicine we cannot know. How many excellent drugs or procedures have been overlooked will never be known.

We are nearing our goal, but let us hope that we never reach it. If we were to come to the end of the road, we would become complacent, lose our curiosity, be sterile in our thoughts and soon lose our identity in the healing arts. Even though we become proficient in the art of diagnosis, expert in the method of treatments, noted for our observations, versed in lore of our profession, we must

never forget the human being we are healing. The man who seeks our aid, and whom we so glibly call "a patient" is a complex organism having many problems. He needs various treatments, both of body and mind. To him a physician is a friend, a teacher, an adviser, as well as a healer. If we remember these things we will deserve the tribute paid us by Robert Louis Stevenson, when he wrote in his well-known dedication to "Underwoods,":

There are men and classes of men that stand above the common herd: the soldier, the sailor, and the shepherd not infrequently; the artist rarely; rarelier still, the clergyman; the physician almost as a rule. He is the flower (such as it is) of our civilization; and when that stage of man is done with, and only remembered to be marvelled at in history, he will be thought to have shared as little as any in the defects of the period, and most notably exhibited the virtues of the race. Generosity he has, such as is possible to those who practice an art, never to those who drive a trade; discretion, tested by a hundred secrets; tact, tried in a thousand embarrassments; and what are more important, Heracleian cheerfulness and courage. So it is that he brings air and cheer into the sick-room, and often enough, though not so often as he wishes, brings healing.

Changes in Electromyographic Wave Forms in Relation to Variation in Type and Position of Electrode

Joseph Goodgold, M.D.
and
Joseph Moldaver, M.D.
New York City

During the past decade, electromyography has been increasingly utilized in the clinical diagnosis of neuromuscular diseases. Although the basic principles concerned with the study of muscle potentials have altered little, details of technic have varied, especially those concerned with the recording electrodes employed. There have been many reports in the literature delineating the qualitative and quantitative aspects of motor unit output in the normal and the pathological states, but there has been a paucity of definition of standard conditions relative to the electrodes used. In view of the continued growth of interest in electromyography in the clinic as well as in the research laboratory, a concise review and correlative study of variations resulting from electrode construction and placement appear to be timely subjects.

This study represents a preliminary report of such a program concerned in this instance, with the type, polarity and spatial arrangement of the recording electrodes.

Polarity

For purposes of general clinical diagnosis, concise specification of the polarity of the unit potentials recorded is not of great essence. In detailed study of motor units, however, such precision is both necessary and desirable.

In recent years, a group of investigators have sought to correlate the terminology employed in electromyography with that used in electrocardiography. Specifically, in the recording of voltages, deflections above the isoelectric line have been defined as positive waves, while the

reverse forms have been termed negative. In classical electromyographic usage, the opposite definitions pertain, i.e., upward deflections are considered negative and downward deflections are called positive. Thus, a confusion in terminology has resulted and has been compounded by the use of electromyographic apparatus in which the effect of an impressed voltage has not been concisely established. Figure 1 demonstrates a complete reversal (mirror image) of the positive and negative components of a motor unit complex by simply reversing the lead-in terminals to the pre-amplifier from a concentric needle electrode.

If specific significance is to be attributed to the presence of "positive potentials" in lower motor neuron lesions, for example, establishing a universally accepted terminology is essential. With new apparatus, the polarity response should be established during construction; with apparatus already in use, the deflection response may be ascertained by using a simple signal device as illustrated in figure 2. Here a minute signal of known polarity is used as an impressed voltage and the character of the deflection may be observed directly on the scope.

In this study, using surface, monopolar, bipolar and concentric needle electrodes, changing the lead-in to the pre-

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This study was aided by a grant from the Dorothy H. and Lewis Rosenstiel Foundation and the Lewis J. and Mary E. Horowitz Foundation.

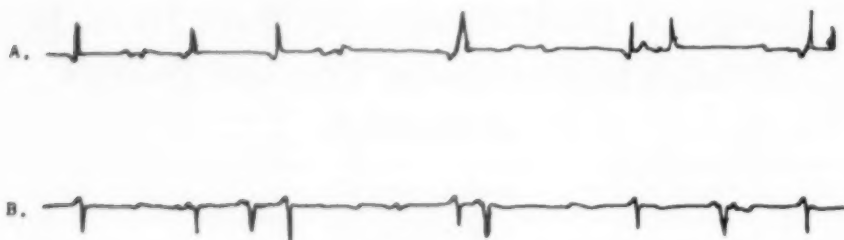


Fig. 1 — Tracings A and B represent complete alteration in wave form upon reversal of lead-ins from the electrodes. Needle electrodes are inserted in the distal end of the right tibialis anterior muscle.

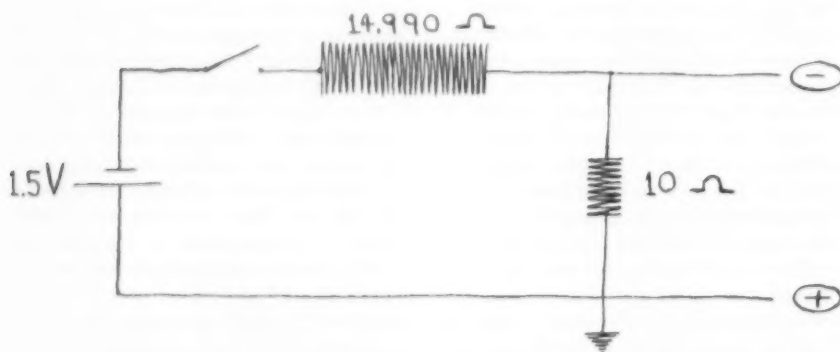


Fig. 2 — A simple circuit for determination of polarity response of the cathode ray oscilloscope to an impressed voltage of known polarity.

amplifier always resulted in complete reversal of the negative and positive portions of the wave forms recorded. There appears to be no relationship between the distance separating the positive and negative electrodes, since variation in distance from ten inches with the surface electrodes down to approximately one millimeter with the concentric needle electrodes, always yielded the same complete change of shape.

Spatial Relationships

The effect of needle placement on the detection and changes in the wave configuration of unit potentials may be observed by study of specific groups of muscle fibers and also by study of the effects of contraction of distant muscle fibers.

When using needle electrodes in the study of unit potential discharges from an individual muscle, the incidence of

monophasic, biphasic and triphasic waves is very well known. The latter variety is most prevalent; the monophasic waves are less frequent. The variation in wave form observed and the chronological order of appearance of the various phases of a given complex potential is a function of the effect on the electrode or electrodes of a voltage generated within a volume conductor.¹ The determinants are the position and the type of electrode in relationship to the point of origin of the voltage within the conductor as well as the type and variety of intervening tissue.

In the study of a specific group of motor units which are discharging, there is a quantitative relationship between the type of electrode used and the circumscribed area within which a voltage output may be detected. In general, monopolar needles can be displaced the great-

est distance before a motor unit is either located or lost. There is, however, a progressive diminution in the voltage, an increase in the duration and some change in the polarity of the individual components of the wave. If an audio output is available, there is a distinctive change in the sound of the motor unit discharge. Jasper and Ballem,³ using monopolar needles, described a sharp cracking sound for close units, a dull thumping sound for units within two-five millimeters and a distant rumbling for units at a distance of five-ten millimeters. With concentric needle electrodes, the findings are essentially the same but the maximal voltage of the close unit is not so great.⁴ In considering similar findings, Cuthbert and Denslow⁴ attributed this lesser voltage to a greater cancellation of potentials when both electrodes were in a given field than when a single electrode was present. In other words, one actually records integrated potentials.

With the concentric bipolar needle, which is constructed by introducing two finely insulated wires within the shaft of a hypodermic needle, the very slightest displacement results in loss of the unit under observation. Although maintenance of position is extremely difficult, this needle may be of the greatest utilization in the study of variations in a single motor unit discharge during increasing contraction of a muscle.

Surface electrodes are not usually applicable in the study of unit potentials. They may be used for study of gross movements, and certainly are most acceptable to the patient. Where there is a requirement for study of individual motor units, and where it is desirable to have minimum of distortion and interference by adjacent muscle groups, such as contracting synergists, surface electrodes should not be employed.

Voltage output from distant muscles is most readily picked up by surface electrodes and adds to the confusion of interpretation; the monopolar needle limits the area of detection but still is not so restrictive as the concentric electrode. The latter is unlikely to pick up distant potentials unless the discharging unit falls within the range of three-eighths of one inch, though this distance may occasionally be greater. A change in wave form (decreased amplitude of voltage and prolonged duration) serves to identify a far distant unit. Figures 3 and 4 relate distance from the firing muscle unit and the pick-up electrode. In A and B of figure 3, the needle electrodes are in an adjacent position. In E and F of figure 4 they are three-eighths of one inch apart. In G and H of figure 4 they are three-fourths of one inch apart.

In an appreciable number of cases, the audio output of the electromyograph may be of greater assistance in differen-

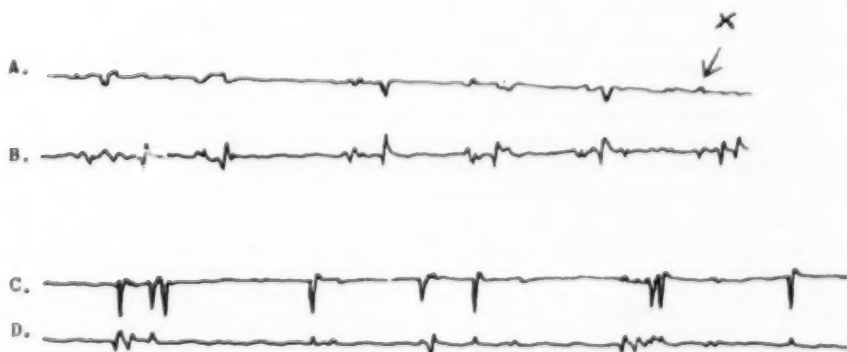


Fig. 3 — In A and B, the needle electrode points are in immediate proximity. In C and D, the needles are separated by one-eighth of one inch. Needles are inserted in the right tibialis anterior muscle. At point X on tracing A, is demonstrated a low voltage, long duration, rounded out wave, which is characteristic of a unit picked up from a great distance.

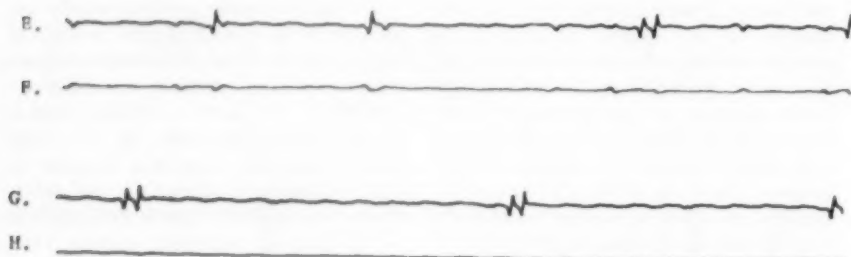


Fig. 4 — In E and F, the needle electrodes are separated by three-eighths of one inch. In G and H, the needle electrodes are separated by three-quarters of one inch.

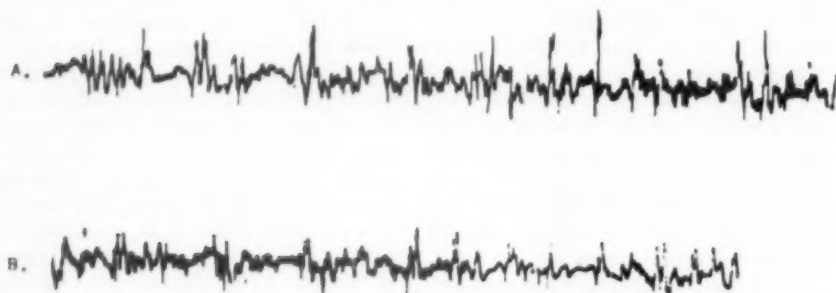


Fig. 5 — Recording of maximal contraction in A, the deltoid muscle; B, overlying the position of the biceps brachii.

tiating distant and close units than is a study of the visible potentials. Figure 5 illustrates a study of a patient with arthrogryposis with congenital absence of the biceps brachii muscle. Figure 5A shows the recording of a strong contraction with the needle inserted in the center of the middle deltoid. In figure 5B, the needle electrode was inserted in the arm in the subcutaneous structures overlying the belly of the biceps. While the tracings are almost indistinguishable, in the former instance the waves were associated with sharp cracking sounds and in the latter case only a diffuse distant rumbling noise was heard. It seems, therefore, that concise electromyographic interpretation requires the use of audio as well as observation of the oscilloscopic tracings.

Summary

Some of the variations in action po-

tentials using different types and position of electrodes have been discussed. It was found that the use of an audio output was of great help and often indispensable for a complete electromyographic evaluation.

For reprints, write Dr. Goodgold, 400 E. 34th St., New York 16, N. Y.

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Nerve Block in Rehabilitation: A Technic of Needle Localization

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Introduction

The interruption of peripheral nerve pathways recently has found increasing usefulness in the practice of medicine. These procedures have profitably been directed toward both efferent and afferent fibers, and as understanding of the role of the various axon groups has progressed, new applications have become apparent. In such, and in the more classical role as a method of anesthesia, chemical block has been found to have continually expanding applications. Its employment has been described for the relief of intractable pain,¹ other pain syndromes,² and for the amelioration of persistent hiccup.³

As the desired locations of block have become increasingly varied, improvements have been sought in the customary technic of employing superficial landmarks for localization of the needle tip. Alexander and Lovell⁴ recently reviewed some of the difficulties encountered, and described a technic of localization using roentgenograms either with or without a radio-opaque medium. However, they pointed out that the number of nerve-block sites having reliable, adjacent bony landmarks is not extensive. In the description of many technics, the production of paresthesia was depended upon for evidence of appropriate apposition of needle tip to the nerve. It has been our experience, however, that paresthesia became difficult to elicit even after the injection of but a few cc. of agent, and at a time when motor function had not been noticeably depressed.

The technic currently employed in this service has been found to overcome many of these obstacles, and it is felt that a more detailed description would be appropriate. It will be seen to resem-

ble closely a method of needle localization described by Sarnoff⁵ in 1951.

Equipment

An electrical pulse generator has been devised which delivers a square wave voltage of .001 sec duration at an interval of one second. The output intensity can be varied from 0.3—30 volts in two ranges. Output voltage regulation is within 10 per cent with load resistances from 3000 ohms upward. Since the duration and interval are fixed, the only control which the operator must manipulate is the one determining output voltage. The output leads are equipped with alligator clips, one of which is attached to an indifferent skin electrode. The other clip is attached to the hub of the needle used in the injection.

Standard 23 and 26 gauge hypodermic needles, one to three inches in length, were used throughout. The needles were abraded with fine emery cloth, and cleansed with either acetone or chromic acid solution. With a stilette in place, the needle shaft was then dipped once or twice into Tygon TP 61 white top coat plastic paint* thinned with TP 91 thinner.* After drying, they were baked at 350 F. for 30 minutes. The stilette was removed and the bevel polished with emery cloth. These needles can be immersed in Zephiran solution for relatively prolonged periods without damage. The remaining equipment consists of a metal skin electrode and elastic strap, a 10 cc. syringe, and 2 per cent Xylocaine (lido-

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This study was supported by the Medical Research and Development Board, Department of the Army.

*Manufactured by U. S. Stoneware Co., Plastics & Synthetics Division, Akron, Ohio.



Fig. 1 — Pulse generator and equipment for injections.

caine hydrochloride)** solution. Because of the fragility of the insulating coating, a standard 19-23 gauge hypodermic needle was used for loading the syringe with the anesthetic agent (fig. 1).

Technic

At a site moderately distant from the location of the block, the skin was prepared with electrode paste and the skin electrode applied. To this, the positive lead was connected. The skin over the injection site was cleansed with 1:1000 Zephiran solution, and the needle with syringe attached was introduced. The negative lead from the stimulator was then applied to the hub of the needle, and the output voltage set in excess of 10 volts.

Usually very brief exploration approximated needle tip and nerve sufficiently to produce visible contractions of the muscles supplied. Where difficulty was encountered, the use of a higher voltage simplified the initial approximation, but also made it less accurate. The search was continued until a minimum voltage produced contraction. In our experience close apposition permitted a stimulus of less than two volts. At this intensity the response was often lost following only a few mm. of needle movement, suggesting further that accurate localization had been obtained.

One to four cubic centimeters of 2 per cent Xylocaine solution were injected. As this was being done the motor nerve response generally ceased. A waiting period of approximately two minutes was allowed, and the exploratory process

repeated. As a rule the threshold was found to have increased markedly. However, if areas of persistent low threshold were encountered, additional agent was injected. This was necessary particularly if the nerve were not closely organized at the level of block, for example, the femoral and axillary nerves. The needle was left in place until physical examination demonstrated a satisfactory conduction block.

Results

A preliminary report can be made at this time. Sixty-seven blocks have been performed on 12 different peripheral nerves using this technic (table 1). Failure has occurred only when mechanical difficulty intervened, usually in the form of disruption of the insulating layer by passage through dense fibrous tissue. It has been possible to block specific branches or fiber groups by careful technic, and the use of small amounts of agent. For example, the branches of the tibial nerve to the gastrocnemius have been interrupted without noticeable impairment of sensation in the foot, or loss of strength in the tibialis posterior. Nerve supply to the vastus medialis has been blocked without apparent alteration in strength of the remainder of the quadriceps femoris.

Table 1: Sites of Nerve Block

Median	10
Ulnar	4
Radial	3
Musculocutaneous	4
Axillary	1
Suprascapular	5
Accessory	2
Dorsal Scapular	1
Tibial	15
Sciatic	9
Femoral	6
Obturator	7
Total	67

**Manufactured by Astra Pharmaceutical Products, Inc., Worcester, Mass.

With the accurate localization that is possible, considerably less agent is used than is often necessary with other methods. The sciatic nerve has been completely blocked with as little as five cc. of 2 per cent Xylocaine solution.

To date this procedure has been found useful in a variety of conditions involving upper motor neurons. In these, its use has permitted accurate assessment of the function of paretic muscles previously obscured by spasticity in their antagonists. It also provided a preview of the results of destructive nerve surgery. This method has also been employed with gratifying success in the evaluation and therapy of joint range limitation secondary to rheumatoid arthritis, and to peri-arthritis of the shoulder.

Summary

A technic of localizing the needle tip in peripheral nerve block has been described. It is sufficiently reliable and ver-

satile to permit a virtually limitless variety of sites for this procedure. The potential clinical indications are protean and numerous.

For reprints, write Dr. Pearson, Dept. of Anatomy, College of Medical Evangelists, Loma Linda, Calif.

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Ambulation of the Severely Handicapped Hemiplegic Adult

Mieczyslaw Peszczyński, M.D.
Cleveland

Many articles¹⁻¹² have been published in recent years concerning the management of the elderly hemiplegic adult. This study deals only with the problems of the severely handicapped in this classification. The subjects treated include gait analysis and gait training, as well as certain selected features which are directly related to the problems of ambulation. The retraining of the upper extremities, certain specific medical problems, speech disorders, and psycho-social aspects of rehabilitating the hemiplegic patient are not discussed here; although the importance of each of these subjects is well recognized.

As soon as the moderately involved hemiplegic patient is able to remain out of bed, and has learned to stand at a handrail, ambulation training follows a logical progression. The patient goes from balancing exercises, to walking along a rail, or between bars; at first assisted, and finally without assistance. The next stage is ambulation outside the bars, with both a cane and the ever present hand of the therapist. Then, very gradually, as the patient gains confidence and increases his ability, the therapist ceases to assist him. We have adopted the principle that while the moderately involved patient is walking between bars, every effort should be made to teach him a gait pattern as similar to the normal pattern as possible. Once he begins walking outside the parallel bars and shows preference for an abnormal gait pattern and more stability with it, he is permitted to continue in his own way. The safety of the patient and the ease with which he walks, are more important than his teacher's ambition that he walk with a "physiological gait." In this respect, every effort is made to assist and accentuate whatever automaticity exists in

the patient's gait pattern.

Balance of the Hemiplegic Patient

Ambulation training for the severely handicapped hemiplegic adult differs markedly from the foregoing outline. Recovery of adequate balance of the involved side is usually hopeless in such a patient, and the main idea is to teach him to substitute for the lost or impaired balancing power of the involved lower extremity by using the functions of the opposite upper extremity.

It is interesting to observe early in the course of the illness how sparingly the patient, who has had a severe vascular accident, uses his good side at the beginning of recovery in even the simplest of daily activities. Marks¹³ indicates that there is probably some involvement of the supposedly unaffected side of the body. A patient's ability to walk will depend essentially on the retraining of the dexterity of the "good" hand and the "good" side of the body.

Most of these patients, at the completion of their training, lean heavily on a cane carried in the good hand. Some of them develop an understanding of the necessity of this arrangement as a result of their own experience and ingenuity. The more passive individual has to be taught to do it.

An interesting abnormality in the patient's sense of the body's position in space is a leaning toward the hemiplegic side. This tendency apparently disappears after a short time in the average hemiplegic. A small percentage of pa-

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tients, however, retain this characteristic in a severe form. As much as three months has been spent in teaching such a patient to overcome this defect and to learn to walk independently.

This phenomenon may be distinguished from such falling as occurs as a result of muscular weakness or incoordination. If the tendency to fall is in the latter category, the patient will uniformly try to avoid falling. However, when the postural reflexes are impaired, the patient is not conscious of his leaning tendency and in fact, any attempt to straighten him will result in a quick "hopping reflex" to resume the original laterally-inclined stance.

There seems to be no simple correlation between the severity of the hemiplegia and the tendency to lean toward the hemiplegic side. Even patients who have had a cerebro-vascular accident, and are without hemiplegia, may show this disorder in a rather severe form.

Another common finding with the severely involved hemiplegic patient is a tendency to lean backward. I am convinced that the patient's space perception is different from that of a normal person because neither persuasion nor visual stimulation will induce such a hemiplegic to stand erect.

The retraining of such patients can often be accomplished by the simple expediency of encouraging continuous walking along a rail until balance is regained. However, when this tendency to fall backward persists because of a purely mechanical aberration, such as a shortened heel cord, a heel lift may be employed to encourage the patient to lean forward. This inclination to fall backward occurs when the individual has a permanent contracture. It is also found in women who are accustomed to walking on rather high heels, and is not to be confused with the heel cord shortening so often observed in a spastic limb.

Many hemiplegic patients are apprehensive about putting the weight of the body in front of the spastic hemiplegic leg with its plantar flexed foot. Experience has shown that the best way to overcome this fear is to have the patient

imitate the abnormal gait pattern of other hemiplegics who either externally rotate the involved leg, or bend at the hips to produce an adequate shift of the center of gravity in front of the ankle of the hemiplegic leg.

The ability to see and to understand details contributing to the individually abnormal gait is of primary importance to the physician's success in rehabilitating a hemiplegic patient. The following considerations are the result of clinical observation alone and not of refined physiological methods of gait analysis.¹⁹⁻²¹

The Spastic Gait: Swing Phase

The common characteristic of the hemiplegic gait is the slowness of the motor performance of the paralyzed limb. The most widely recognized feature of the hemiplegic gait is circumduction of the hemiplegic leg; yet the etiology of this circumduction is rather poorly understood.²²

One of the major aberrations seen in the hemiplegic gait is loss or suppression of many of the synergistic and smoothly coordinated motor patterns of the normal gait. Hence, it is often observed that some hemiplegic patients with apparently minor disabilities who still possess, for example, the power to dorsiflex the foot voluntarily, do not in fact, do this during the swing phase if they are not asked to concentrate specifically upon clearing the ground with the hemiplegic foot. When they do perform this movement, however, we often find that because of poor harmonization with hip flexion, dorsiflexion of the foot and flexion of the knee appear too late, thus occurring at the end, rather than at the beginning, of the swing phase.²³

Stance Phase

Among those aberrations of gait seen during the stance phase, one may first consider the variety of ways that the hemiplegic patient deals with the often present tightness or contracture of his calf muscles. In the severely involved hemiplegic patient, the calf muscles of the involved side are not able to perform the fine play which is typical of the

stance phase, particularly during the take-off or spring. These muscles are spastic and contracted with a resulting plantar flexion of the foot. This is a serious obstacle to any forces available to produce the forward fall of the body so essential at this stage of the gait.

Only the patient with mild spasticity of the calf muscles and with good balance will sufficiently increase the propulsion of the good leg to overcome the spasticity of the supporting one. The very spastic patient will be prone to avoid this forced propulsion. He prefers to rotate externally the whole leg so that he walks with the hemiplegic foot directed sideways. This externally rotated leg gives him a singular gait in that it releases him from the need to overcome the tension of the spastic foot and calf muscles, and gives him better balance in the frontal plane of the direction in which he is walking.

No longer does internal rotation of the leg occur very often in the ambulatory elderly hemiplegic. A history of late commencement of ambulation training in a rather spastic patient and a tight gracilis muscle may frequently be found in those few hemiplegics in whom there is present this internal rotation of the leg. However, the phenomenon is often observed in children with congenital hemiplegia. Pronation of the involved foot, frequently seen in such children, seldom happens in the adult. When it does occur, it is usually connected with a history of early ambulation of a hemiplegic who has had a very prolonged period of flaccidity.

Another method, which may be employed by the patient either alone or in combination with the aforementioned, is seen in those who bend forward at the waist at the beginning of the supporting phase of the paralytic leg. This enables such a patient to lose forward balance without having to overcome the tight "heel cord" to permit performance of the swing phase of the good leg.

Often the patient is unable to achieve sufficient flexion at the hip to initiate the swing phase of the hemiplegic limb. One will note that the patient may then

thrust the trunk toward the good side and backward in order to get started. This is the best means available for producing a tilt of the pelvis upward on the involved side. This in turn permits performance of the swing phase of the extended paretic leg by means of a thrust backward of the trunk. The entire walk may be executed using gross trunk movements, that is by leaning forward to prepare for the swing of the good leg, then toward the good side and finally backward to initiate the swing phase of the hemiplegic limb.

Prolonged Flaccidity

A rather large percentage of severely involved patients belongs to the group of hemiplegics who have shown prolonged flaccidity.²³ It is easy to surmise such a history when one observes a limply hanging upper extremity, with no tendency to flex the elbow during ambulation. These patients develop, with time and training, enough stability in the lower extremity to enable them to bear weight without bracing of the unstable knee.

Such patients, with a predominantly flaccid hemiplegia, will circumduct the leg during the swing phase by thrusting the trunk toward the good side of the body and backward, so that the pelvis on the involved side is raised and the leg swings through. Occasionally a patient will have sufficient residual muscle power in the lumbar region of the hemiplegic side to assist in lifting the involved pelvis. This circumduction is pendulous in appearance, and during the early training period one frequently observes that the leg comes to rest in front of, or across, the supporting leg at the completion of the swing phase.

Root Joint Involvement

A rarely encountered type of hemiplegia is of the so-called root joints, i.e., the shoulder and hip. Some patients with this involvement have good recovery of the fine foot movements including toe movements, inversion, eversion, and dorsiflexion of the foot. They have a very unstable hip joint. The classical gluteus

medius gait is most uncomfortable and difficult for the hemiplegic. If provided with the support of a cane he will walk with a modified gluteus medius gait. The cane is carried in the good hand. During the stance phase of the hemiplegic limb, the patient leans on his cane for support and the necessity for thrusting the trunk sideways is removed. In other words, the simple expediency of utilizing a cane does not return the strength of the gluteus medius, but it removes the most difficult feature of this type of gait, namely, the thrust of the trunk toward the involved side.

Intermittent Double Step Gait

Certain hemiplegics walk with a pattern which the author calls the "intermittent double step gait." There are two variations of this extremely useful gait. In the first type, the patient tends to lose balance abnormally during the stance phase of the hemiplegic leg. In the second type, he loses balance abnormally during the swing phase of the paralyzed limb. These deviations produce characteristically distinctive patterns.

The patient displaying the first variety of the intermittent double step gait will lose balance the moment weight is placed on the hemiplegic leg. In order to regain his balance he will execute a short swing of the good leg, and then pause—hence the name "intermittent double step gait."

The hemiplegic showing the second variety of the gait will lose his balance during the very slow swing phase of the affected limb. He demonstrates another example of the lack of harmonious correlation between muscle groups since this loss of balance may be attributed to the delay in commencement of the restraining phase by the hemiplegic leg. The patient reacts to the shock of imbalance, as he does in the first type, by pausing. Instead of carrying the affected limb through the continuous cycle of restraint followed smoothly by propulsion, the patient pauses during the restraining phase.

These two patterns of "intermittent double step gait" are usually characteristic of only moderately involved hemiplegic patients. However both types

should be utilized frequently as good patterns to teach some of the more severely handicapped hemiplegic patients to walk safely.

Miscellaneous Features of the Gait

A very interesting reflex phenomenon is frequently seen when the spastic hemiplegic arises from his chair. The affected limb flexes at the hip, knee, and ankle, and after a few moments gradually straightens out. The patient must be warned of this eventuality and trained to wait those few moments for the leg to extend itself before starting to walk.

The tendency to hurry on approaching a chair or seat is typical of some of the severely handicapped patients of any type and especially of the senile. Such a patient usually stops walking about two feet from the chair, leans forward to grasp its arm, and then falls into it as he unsteadily rotates his body.

That this reaching-out phenomenon is unrelated to the failing vision of the elderly is demonstrated by another similar example. These hemiplegics, when approaching a curb, a low step, or even the threshold of a doorway, will stop about two feet before reaching it and then take a large and consequently unsafe, step with the good leg to cross over the seemingly minor obstacle.

The hemiplegic patient may have special problems in passing either persons or objects. Wide experience has shown that the severely handicapped hemiplegic has to be taught to avoid objects which, or persons whom, he encounters on his sound side, since he is prone to fall toward the hemiplegic side whenever he meets such obstacles. He should either stand still until he is passed by the approaching person; or make a wide circle around the stationary object. The effect of strong unilateral visual stimuli upon the patient's sense of the position of his body in space is now under investigation.

Postural reflexes which are dependent upon the cerebral cortex²¹ and its connections, are sometimes impaired in the patient with a cerebro-vascular accident. When the foot placing reaction is impaired, the patient is unable, except by

chance, to place his foot flat on the ground automatically and without hesitation as it approaches the flat surface.

There is little specific knowledge about the factors responsible for incoordination in the hemiplegic. Suffice it to indicate that the examiner must consider the possibility of apraxia, involuntary movements, or cerebellar factors producing the observed incoordinate manifestations. It is not always appreciated that mild incoordination of the trunk and of the root joints, particularly the hips, appears in patients with hypertensive encephalopathy and may be a major obstacle to training in ambulation.

The influence of the involvement of disturbed perception upon ambulation is now being investigated.²³ The role of the conventionally examined and recorded sensory system and that of the patient's evaluation of the position of his body in space is not well understood. We know from experience that the elderly adult patient who is hemianesthetic and hemianopic is able to adjust himself with some difficulty to ambulation, but that this adjustment is seriously limited in scope. A study of the influence of the hemiplegic's own body concept on the ability to learn to walk is now under consideration. It is hoped that some practical prognostic testing methods for early evaluation may thereby be discovered.

For reprints, write Dr. Peszczynski, Highland View Hospital, Harvard Rd., Cleveland 22, Ohio. A technically detailed version of this study may be obtained in mimeographed form from the author.

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Physical Handicap and Personality: Study of the Seen Versus Unseen Disabilities

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Introduction

While the effects of physical handicap upon personality have aroused much speculation, it is only in recent years that psychology through scientific research has been applied in order to achieve a greater understanding of the problem.

Meyerson¹ points out attitudes toward the handicapped which reflect the "Greek view of 'a sound mind in a sound body' with its negative implication of a crooked body, crooked mind, crooked personality." Menninger² considers the problems of the handicapped in terms of the unaccepting attitudes toward people who are different. He refers to the unfortunate fact that people are greatly influenced by visual impressions and tend to react to "the house in which man lives and not the man himself."

The social psychological implications of the seen or unseen nature of physical handicap would seem most significant as a force affecting the individual's personal adjustment. In his writings Barker³ "conceives personal adjustment to physical handicap as a problem in social psychology, i.e., in terms of the effect of a deviation in physique upon the personality and social behavior of the individual."

According to Meyerson⁴ "there is general agreement in the literature on phys-

ical disability that the major problems of the handicapped are not physical but social and psychological. According to Menninger² "his final solution is dependent very largely on the attitudes and behavior of the people around him." Those with visual handicaps, therefore, may tend to elicit more readily unfavorable attitudes from others. It is not so much what people say to the handicapped that is disturbing but rather what is subtly, though dramatically, communicated to them through facial expression and behavior. Individuals with observable handicaps are more readily exposed, not only to subtle expressions of contempt or ridicule, but to overt negative reactions.

Seidenfeld⁵ in a preliminary study, examined the characteristics of a selected group of 100 school children with poliomyelitis to determine whether the presence or absence of a disability may be considered responsible for variations in psychological characteristics. On the basis of his findings he believes that the pattern of the non-disabled group is probably a true pattern and "characteristic of that group." He says, however, that it is still necessary to learn whether the pattern found can be used as a dif-

⁵Staff Member, Seizure Clinic, Columbia-Presbyterian Medical Center, New York City.

ferentiating criterion between "non-apparents" and "apparents."

Schilder⁸ regards the awareness of one's own body as basic to the mental life of the individual, and as involving different processes from one's awareness of the external world. Under normal circumstances, the body image and body structure reveal no discrepancy. However, discrepancies between the image and structure of the body may result from neural disorder and somatic disease. When physical handicap is overtly manifested, greater difficulty may result in reconciling the distorted body structure with the body image.

The individual's contact with social reality is through the resources of his psychophysical being. The appearance of the human body is the first and most obvious aspect of the total individual that is observed by others. It is part of the human being which is in the realm of awareness. Consequently, it was considered that the personality organization may well be influenced not so much by the nature of the body distortion or physical handicap *per se* as by the way in which this handicap has manifested itself. It was hypothesized that there would be differences in aspects of personality of physically handicapped individuals which could be related to the seen or unseen nature of the handicap.

Subjects

Thirty white, male, physically handicapped patients between the ages of 17 and 44 were studied by a clinical qualitative analysis of their Wechsler-Bellevue Intelligence Scale, Sentence Completion and Rorschach test performance. There were two groups of patients: Fifteen with observable disabilities and fifteen with unseen disabilities. The former group included diagnosis of poliomyelitis, amputation and other externally manifested disabilities. Specifically there were three cases of poliomyelitis, seven amputees, two paralytics (non-poliomyelitic), one back injury, one case of epiphysitis of the spine, and one osteomyelitic. The group with unseen handicaps included diagnosis of tuberculosis, cardiac con-

dition, and other internal disabilities resulting from disease or injury. Specifically there were four cases of tuberculosis, eight cases of rheumatic heart disease, one case of chronic valvular disease, and two cases of bronchiectasis. Cases which were classified as psychosomatic or psychiatric illness were not used.

The patients were active cases in the files of the New Jersey State Rehabilitation Commission. Consecutive active cases that met the criteria of this study were utilized as subjects. Following the procedure in selecting subjects, the groups were equated for age, education, and age of onset of handicap. The variables of sex and color were also held constant for both groups.

Method and Procedure

The group data was analyzed by 1) setting up and defining personality characteristics in the form of judgment categories; 2) these characteristics were judged in terms of presence or absence, and were made independently by two qualified clinical psychologists; 3) when significance of agreement was not obtained between the judges with regard to several characteristics, all characteristics were redefined and judgments made again; 4) the direct method of obtaining probability was used to establish the significance of agreement between judges; 5) when lack of agreement persisted, following the rejudgments, the particular characteristic was discarded and regarded as not capable of being judged reliably, and 6) the direct method of analysis was employed to compare the groups with regard to those characteristics which yielded significant inter-judge reliability.

Results of Group Comparison

The original checklist of characteristics presented for judgments in terms of significant presence or absence included sixty-five personality characteristics. After having had adequate opportunity to become thoroughly familiar with these items and their meanings, the judges agreed to eliminate thirteen items for one or more of the following reasons:

The characteristic could not be detected in psychological tests; the characteristic was covered in another item, or adequate mutual understanding could not be derived from definition, explanation, and discussion of the particular characteristic. Thus fifty-two of the sixty-five characteristics remained.

By empirical testing of some artificial examples it was determined that it would take a minimum of eleven agreements in each group or a total of twenty-two to arrive in inter-judge agreement significant beyond the five per cent level. Depending on the marginal total of the contingency tables, more than twenty-two were necessary in most cases.

In the first series of judgments there were sixteen of the fifty-two selected characteristics which satisfied the criterion of having agreement in at least twenty-two of the thirty cases. The degree of agreement between judges was disappointingly low. Therefore the need for redefinition of characteristics was indicated.

Resubmission of only those characteristics where a minimum of twenty-two agreements was not found suggested the danger of unequal conditions for rejudging the selected items in the checklist. Consequently, in order to prevent the entrance of unknown variables and maintain constancy of circumstances under which the characteristics were to be judged, the entire revised checklist of fifty-two selected items was resubmitted to the judges along with the psychological test records.

This second series of judgments resulted in twenty-six characteristics of fifty-two having a minimum of twenty-two agreements out of thirty cases. Then by the direct method for obtaining probability, significance of agreement between the judges was statistically established for ten characteristics.

These characteristics and their *P* values are as follows: Too high goals—.008; resistance to authority, negativism—.032; hypochondriasis—.002; irritability—.002; lability—.002; suppression of emotions—.002; low tolerance level—.043; impulsivity—.020; conformity—

.002, and inhibition—.006.

Of these characteristics which were judged reliably there were only two in which significant differences were found between the groups; one difference was found significant by one judge and the second by the other judge. According to the second judge the groups are significantly different in terms of "lability" with the seen group being more labile. Ratings established by the first judge indicated no significant differences to exist between the groups. Both agreed that lability was present in four seen and two unseen cases. The first judge rated it for presence in five seen and three unseen subjects; the second judge rated presence for nine seen and three unseen cases.

The data suggest that physically handicapped people with seen disabilities may be expected to be more labile than those with unseen disabilities. It must be noted, however, that this finding was not corroborated by the first judge. Also to be considered in the evaluation of lability is the fact that this is one of two instances of significance at the five per cent level out of twenty comparisons, where one out of twenty (five per cent) on the average can be expected to be significant due to chance alone. This not only questions the validity of this significant difference but leaves it as an hypothesis worthy of further experimental testing.

There is a lack of material in the literature to support or refute this finding. One study which mentioned lability with respect to the physically handicapped was that of Jaensch,² in which he tried to determine the psychological type of tuberculous patients. He concluded that they were primarily the synaesthetic type and were characterized by lability, autistic thinking, shallow feeling, and anti-social tendencies. In view of the evidence, the obtained differences in lability can be taken only as suggestive.

According to the first judge the groups are significantly different with regard to "conformity." The unseen group was judged to be more conforming than the

seen group. The ratings of the second judge indicated no significant differences between the groups. The judges agreed that conformity was present in three seen and seven unseen cases. The first judge rated it as present in eight seen and thirteen unseen subjects, with the second judge finding presence of conformity in nine seen and eleven unseen cases.

The data suggest that physically handicapped individuals with unseen disabilities may be expected to be more conforming than those with seen disabilities. However, it must be noted that this finding was not corroborated by the second judge. As mentioned in the interpretation of lability where significance of differences was established by one judge, chance factors may be responsible for this "significant" difference.

Discussion

It has been evidenced from the results that eight of the ten characteristics which yielded inter-judge reliability did not discriminate between the seen and unseen nature of physical handicap. The other two characteristics yielded significant differences, each on the basis of a single judge's rating, which might occur on the basis of chance alone.

Personality characteristics must be regarded as being on a continuum, and presence or absence is always a matter of chance. They were rated as present only if, in a clinical sense, they were found to be of significance in the record. The clinician, in an attempt to prove an hypothesis, if not cautious, might readily fit fact to theory. In this respect, the "seek and ye shall find" attitude can be a dangerous one.

For instance, although a high level of aspiration was evidenced in the majority of subjects, this was not indicated in the ratings because it was within the achievable limits of these subjects. Individuals in both groups made effort to compensate for their experienced feelings of inadequacy.

Resistance to authority or negativism in general, was infrequently found in the records. The hostilities and resentments

felt by these patients seemed to be largely repressed owing to fears of rejection and the strong need to be viewed favorably by others.

Hypochondriasis was markedly absent in these physically handicapped patients. It was discovered that anxiety was, more frequently than not, handled by resorting to repressive measures, constriction and depression. Bodily preoccupation did not seem to be the focal point for the displacement of anxiety.

In the main, most of the subjects revealed a tolerance level below that requisite for healthy functioning, even though it was not considered in all cases by the judges as significantly low. There was a general tendency in the groups to suppress emotional expression and control their impulses. This was anxiety provoking, relating to the threat of rejection. Defensive inhibition was often present though not always successful.

The evidence found with respect to lability and conformity is merely suggestive and in need of further experimental validation. Each of these characteristics was found to discriminate between the groups by only a single judge. Furthermore, as previously indicated, chance factors may be responsible for these findings.

Generally, in both groups, there was a strong tendency to lean on familiar supports and adjust by adaptation and submission with dependence upon conventionalities. However, it was in the unseen group that conformity was found to a significant degree.

While the ratings of the second judge yielded significant differences between the groups for lability, it was not found with very large frequency in either group.

It is evident that one group is not significantly different from the other on the basis of those characteristics that could be statistically evaluated. As a matter of fact, similar trends seem indicated in the entire sample population. The results of this investigation indicated that the nature of the handicap, seen or unseen, does not lead to a constellation of characteristics that make these pa-

tients dissimilar. However, it is possible that the real significance of this study may be in the lack of significant differences between the two groups. Continued investigation in this area will be required to determine this possibility.

Summary

Utilizing the Wechsler-Bellevue Intelligence Scale, Rorschach test, and a Sentence Completion form, comparison was made between patients with seen and unseen physical handicaps. The results indicate no significant difference between the two groups. It seems noteworthy that a similarity of trends was found to exist between the two groups.

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WHAT?

*34th Annual Session of the American Congress
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Management of the Industrially Injured Hand

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and
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New York

Introduction

According to figures compiled by the U.S.P.H.S.,¹ hand injuries constitute thirty-five per cent of all industrial injuries. In 1952, there were approximately 1,200,000 industrial hand injuries which resulted in loss of time from work; 500,000 persons so injured had some residual permanent disability. The following figures, computed by the New York State Workman's Compensation Board,² illustrate this trend and demonstrate some of the important financial considerations. The management of industrial hand injuries is therefore one of the most important medical problems of this century.

Year	1950	1951	1952
Number of cases	24,577	29,185	31,413
Per cent of cases	24.4	24.9	24.8
Compensation	\$9,913,833	\$11,837,135	\$13,355,839
Per cent of total compensation	14.2	14.1	14.1

Thus far, hand injuries have received inadequate attention. For example only six hospitals in the Greater New York Area recognize the importance of hand problems by maintaining separate services for hand surgery. The intricate anatomy and function of the hand requires a surgeon who is well versed, through constant practice, in the management of such injuries. The care of the injured workman must be continued until he has successfully returned to and managed to stay at work. This may be on the same job, or in presence of disability, it may mean a new job within the limit of his ability. The surgeon must not discharge a patient at the time of wound healing. His responsibility is to see that the proper rehabilitation procedures are instituted. Frequent conferences between the surgeon and the rehabilitation expert are necessary to estimate progress, outline further therapy or terminate therapy.

The patient with a recent injury is frightened. He is not only threatened with loss of hand or fingers, but also with loss of pay and possibly loss of job. His intelligence, understanding, and willingness to cooperate are very important factors in his care. Is he willing to sacrifice a few weeks or months for a good final result? He may have anything from a minimal injury or a hand literally crushed to bits. The immediate reassurance that he will be cared for until he can return to work will minimize some of his apprehension.

Position of Function

Modern surgical judgment calls for more than evaluation of anatomical injury; it also includes evaluation of the personality of the patient. The premorbid psychological make-up of the patient plays an important factor in the extent of the surgical therapy. The best results can only be obtained through full cooperation of the patient. Even the most expert surgical attention will be nullified by an uncooperative patient. It is of the utmost importance that a patient with a hand injury be properly managed from the time of receiving first aid until his return to work.³ Initially the wound should be covered with sterile gauze and the hand placed in the position of function. With certain exceptions, this position of function should be maintained throughout the treatment period. Just

Read at the Thirty-second Annual Session of the American Congress of Physical Medicine and Rehabilitation, Washington, D.C., September 8, 1954.

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what is this position of function? It has been often described. Simply, it is the position into which the hand falls naturally in grasping an object approximately one and one-half inches in diameter. The thumb is well opposed in front of the index and middle fingers. The fingers are all curved, with the wrist in thirty degrees dorsiflexion. A stiff hand in this position with a residual of one-eighth of an inch of finger motion can grasp and pick up an object. We know from experience with amputees that a grasping hook performs the basic functions of the hand.

Examination and Diagnosis

After the patient has received first aid, he must be examined by a competent observer. Diagnosis is made by inspection and functional testing with maintenance of sterility. The wound should not be disturbed by use of an instrument or liquid. Tendon function is best determined by testing motion against resistance. The nerve status is evaluated by sensory and motor function tests. A roentgenogram should be taken in two planes at right angles and obliques if necessary. After the examination, including x-ray, a long range plan should be made. Such plan has to be carried out in terms of the patient's personality, type of employment and long range perspective of possible multiple operations.

Edema

Edema—caused by injury, caused by surgery, caused by infection—is our worst enemy. The best technical effort can be negated by it; and our best results can be obtained only by preventing it. In any swollen hand the protein-laden edema fluid is rapidly organized into fibrous tissue.⁴ Even an uninjured hand which is edematous for an appreciable period of time may have permanent limitation of motion due to scar formation. Atraumatic surgery and excision of all dead tissue plays an important part in prevention of edema and infection. Elevation of the hand and immobilization of the wounded parts aid in limiting the edema. We have found ACTH⁵

to be of value in crushing injuries. In all uninfected wounds Hydrocortone⁶ is instilled to prevent additional edema.

All uninjured parts of the affected extremity are kept in motion. Movement of the fingers will produce the pumping action which empties the hand and forearm of venous blood and encourages the lymphatic flow. Motion of all uninjured parts will prevent them from becoming stiff. Splinting, preferably in plaster or bent metal, in the position of function must be maintained until the wound has healed. Moving a healing wound results in increased fibrosis. If for some reason, such as after a suture of a flexor tendon, the hand is kept in a non-functioning position, the position of function must be obtained as quickly as possible. During the entire healing period, all unsplinted joints must be moved several times a day through range of motion. Too rapid mobilization of joints which have been held immobile for two to three weeks, results in pain and muscle spasm and defeats the purpose of attempted mobilization. A warm bath encourages the patient to move his joints. It helps him realize that he can perform motion without pain. Following this gain of confidence he then may be persuaded to move more forcefully, thus producing growth of atrophic muscle.

Case History

A careful history including employment details and social background is taken on every hand patient starting rehabilitation. It is noted whether the patient is right- or left-handed. The range of motion of shoulder, elbow, pronation and supination, wrist, ulnar and radial deviation, and fingers, is checked and carefully recorded in terms of degrees. The strength of all muscles of the extremity is checked. Particular attention is given to the power of dorsiflexors of the wrist. It is a frequent finding that weakness of this group of muscles is the main cause of an insufficient grasp power. Careful attention to uninjured joints is stressed. Frozen shoulder or elbow may present as much of a problem as the hand injury itself. The majori-

ty of procedures used in rehabilitation of hand injuries do not necessitate any expensive or complicated equipment. The outstanding prerequisites are time, patience, ingenuity, and modalities. The main purpose can be generalized into two points—increase of the range of motion, and increase in strength.

Placing the injured hand in the position of function has already been mentioned. Following the acute stage, efforts are made to prevent any progress of contractures which might be caused by immobilization and increasing the range of motion.

In presence of healing wounds, whirlpool bath for one half-hour is applied to decrease edema and to utilize the "softening" and analgesic effect of hot water. In later stages, paraffin bath is preferred because of its higher temperature. Following this treatment, the patient exercises the hand and wrist through the range of motion under the constant supervision of the therapist. Passive motion of fingers is avoided.

Patient is then given progressive resistive exercises either manually or with the aid of the pulley systems on the Kanavel Table. After the treatment session in the Physical Therapy Department, the patient is referred to the Occupational Therapy Department. We have found Theraplast, a plastic putty, to be one of the mediums of choice in exercising both flexors and extensors. A marble placed in the putty solves the difficult problem of exercising extensors. For strengthening grasp power, we have used the leather puncher in the following manner. The patient starts first with punching thin paper, and then goes on to heavy leather as strength increases. Woodwork, clay, and looms are used whenever indicated. After work in the Physical Therapy and Occupational Therapy Departments is completed, the patient spends one to two hours in the recreation room. Many of our patients will use the cue stick in pool, table tennis paddle, piano, checkers, etc., before performing almost any other motions. The activities in the recreation room give us an added chance to make certain that

the patient is using the affected extremity for at least part of the day.

It is our definite opinion that the best results are obtained through a daily program. Although home programs are outlined in detail, the great majority of patients find themselves unable to follow them without supervision.

When the severity of the injury prevents the patient from returning to his original occupation, he is referred to vocational agencies for retraining. We would like to stress however that the physician's responsibility continues until the patient is gainfully employed. The following cases illustrate the results which can be obtained through close cooperation of the Surgical and Rehabilitation Departments.

Beckman-Downtown Hospital U53-1543: This twenty-nine year old pressman inadvertently placed his hand in a printing press. The injury was an incised wound involving the extensor tendons to his thumb, index finger, and wrist. It was learned by history and examination that thirteen years before an incised wound had severed his flexor pollicis longus and he had worked without the use of the complex function of this muscle tendon. It was decided to suture the recently incised extensors; after these had healed and after his extensor muscles had recovered to maximum strength, restoration of his flexor mechanism was attempted.

Four months after the repair of his extensor tendons, he had recovered the power in these muscles. He was operated on again and the sublimus tendon of the ring finger was transferred as a substitute to replace a very fibrotic flexor pollicis longus. The patient's thumb and wrist were splinted in plaster for three weeks.

After the removal of the splint, the patient was given whirlpool baths, later changed to paraffin baths, and active supervised motion. After this had been accomplished, progressive resistive exercise manually and with pulleys was done. In Occupational Therapy he used putty, finger weaving, and leather punches. As he became stronger he worked at the



Fig. 1 — Injured hand.

wood bench.

Since the usual rehabilitation session was four hours in duration, this patient played pool, ping pong, and checkers during the last two hours. Full strength was recovered approximately three months after the second operation. He returned to his job.

Beekman-Downtown Hospital U54-0487: This twenty-year old male caught his left hand in a bottle capping machine. He sustained a crushing tearing injury with amputation of the ring finger, avulsion of the dorsal skin, and multiple wounds of the index and middle fingers. The distal half of the index finger was hanging by one blood vessel and the flexor tendon. After initial surgery this patient's hand was splinted in the position of function for three weeks. The index finger tip remained barely alive and shrank to two-thirds of its former size. The fracture healed slowly

and mobilization was started approximately four weeks after the operation.

Because of the severity of this man's injury, his program was slower in pace. He was given much more gentle motion until the sensitiveness of the hand diminished. Seven weeks following the injury, the patient had marked limitation of motion of all finger joints and only forty-five degrees of supination. Grasp power could not be measured. Patient received daily treatment consisting of paraffin bath and active and resistive exercises in Physical Therapy; exercises with putty, typing, use of table loom in Occupational Therapy; and played ping pong and pool in recreation. After two and one-half months of this regime, patient had almost full flexion of his fingers, however, scarring limited extension. His grasp power increased to fifty pounds. There was parallel increase in strength of all muscles of the left upper extremity.



Fig. 2 — After repair.



Fig. 3 — Exercising the extensor muscles by means of plastic putty.

As he vigorously moved his hand it was obvious that a tight volar scar was limiting extension of the middle finger. Accordingly, four and one-half months after injury, the scar was excised. A Z-Plasty and full thickness graft corrected this contracture. The healing was rapid and three weeks after surgery he again was doing his active exercises in the Rehabilitation Department.

Beekman-Downtown Hospital U54-2146: This twenty-three year old truck driver suffered a laceration of the wrist. On examination there was no flexion power in the right index finger. Loss of sensation over the distribution of the median nerve, and lack of opposition of the thumb was noted.

Immediately after admission surgery was performed. Both flexor tendons to the index finger were sutured at the level of the carpal ligament and the median nerve was sutured. Post-operatively he was placed in a plaster splint in flexion for three weeks.

Mobilization of the wrist and hand was a slow process. Particular care was taken not to injure the anesthetic areas of skin. In spite of careful instructions to avoid hot objects, the patient burned his index finger quite severely seven weeks after the injury.

Three and one-half weeks after injury, patient had no dorsiflexion of the wrist, fifty degrees limitation of flexion of the metacarpal phalangeal joints, and thirty degrees of the inter-phalangeal joints. He was unable to oppose. Following a five-week rehabilitation program,

the patient had forty degrees of dorsiflexion of the wrist. He had full flexion of the fingers, grasp power of fifty-five pounds and good opposition. Patient returned to supervisory work while increasing strength of the affected extremity.

Summary

Industrial hand injuries are an increasingly important problem.

Cooperation between the surgeon and



Fig. 4 — During rehabilitation.

the physiatrist at all stages results in optimal care.

The total approach to the patient as an individual is as important in hand injuries as in any other medical condition.

The increase in range of motion and strength is obtained through active treatment under supervision.

Patient's program is divided among physical therapy modalities, rehabilitation gymnasium, occupational therapy shop, and recreation hall.

Patient's medical care is continued until he is returned to the job.

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Value of Therapeutic Exercises in Thoracic Surgery

Albert Haas, M.D.
and
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New York City

Treatment

Treatment of tuberculosis has changed greatly in the past two decades. Bed rest, which formerly constituted the main basis of therapy, has been replaced by intensive antibacterial treatment. Surgically, thoracoplasty is being rapidly supplanted by excisional procedures. The latter approach was known to the practitioner early in 1930, but was relatively dangerous. With development of better methods of anesthesia for intra-thoracic surgery and the anti-microbial drugs, resection today is a relatively safe procedure. The primary objective of combined medical and surgical intervention is first to reduce the lesion to an absolute minimum and then remove the affected area be it wedge, segment, lobe or a single lung.

Technic Modifications

Concomitantly, technics of thoracoplasty have been greatly modified with the result that undesirable side effects have been circumvented. Formerly, the thoracic surgeon limited his approach to resection of ribs, thereby allowing the ligamentous and muscle attachments to collapse the lung. Today, the ribs are stripped of their periosteum and plastic material is inserted between the musculo-periosteal sheath and the under-surface of the ribs to produce a collapse. This "plombage" form of thoracoplasty involved much less skeletal mutilation than the related surgical procedures of the past, because the ribs remain in situ. Moreover, the new technic effectively prevents the very painful and disabling overriding of the scapula on the underlying ribs when the arm is used. Avoid-

ance of this complication prevents a possible frozen shoulder. In an effort to prevent pain, due to the overriding scapula, the patient tended to immobilize his arm. This resulted in fibrosis and ankylosis of the joint. To anticipate the foregoing condition, surgeons were often forced to resort to partial scapulectomies. Although such procedure lessened local discomfort, they were bound to increase the mutilation and resultant kinesiological imbalance of the affected side. Plombage thoracoplasty now avoids these complications, and in addition, this procedure is done in one stage. It is evident that both the medical and surgical therapy of tuberculosis have been making rapid and amazing advances.

In the field of rehabilitation of tuberculous patients, physiatrists must intensify efforts to establish an effective therapeutic approach. Admittedly, relatively very little progress has been made in this area until recent years, yet the potentialities for beneficial results are limitless. As in all other ailments and disabilities, rehabilitative care is the vital and indispensable fourth phase of modern medicine.

Objectives

Aside from control and cure of the basic ailment, our objectives are to minimize post-operative disabilities and deformities, and to reestablish the maxi-

Read at the Thirty-second Annual Session of the American Congress of Physical Medicine and Rehabilitation, Washington, D. C., September 10, 1954.

Physician in charge of Chest Rehabilitation, New York University-Bellevue Medical Center.

Professor and Chairman, Department of Physical Medicine and Rehabilitation, New York University College of Medicine.

This program was conducted by the Physical Medicine and Rehabilitation Department of New York University in conjunction with Chest Service, Bellevue Hospital.

mum possible degree of muscle function and range of motion.

Already noted is the fact that current surgical procedures are far less mutilating than before, but it is still necessary to sever the powerful muscles of the upper back when entering the chest wall. Since the trapezius, rhomboids, latissimus dorsi and the serratus anterior are severed, progressive structural scoliosis and deformity of some degree are inevitable if the resultant muscular imbalance is not quickly restored to normal. With the muscles of the involved side impaired, the contralateral muscles become disproportionately strong, pulling and twisting the skeleton into deformation. In addition, post-operative trauma leaves a trail of fibrosis, matted soft tissues, atrophy, and neuromatous pain. Dysfunction, malposition and ankylosis of varying degree are encouraged. Thoracic surgery, however skillful, remains one of the most traumatic and mutilating operative procedures. If this residual damage is treated inadequately both the anatomic and the physiologic results may be most unsatisfactory. Experience at Bellevue hospital has shown that intelligent and persevering post-operative rehabilitative care effectively nullifies the undesirable pathological sequelae and brings about most satisfactory restitution of function.

Approach

Our general approach has been to concentrate on effective measures of lessening fibrosis and matting of surgically traumatized tissues, and an early start in reconditioning the surgically weakened muscles in order to hasten restoration of strength and function.

Indirectly, the achievement of this objective is the most effective means of preventing scoliotic torsion of the thoracic spine. Ultimate success of the exercise routine will vary with severity of the residual trauma, where surgical requirements leave a great deal of devastation of bone, ligaments, muscles, nerves and blood vessels. Prognosis is bound to vary in each specific case.

Where thoracic surgery is conducted

in successive stages, the resultant trauma is repeated. We may, conscientiously, try to obtain most satisfactory recovery of function and avoid post-operative deformities, only to learn that the individual requires further surgery. Patience is a must in rehabilitation of the tuberculous.

Bellevue Program

At Bellevue Hospital, during the past five years, a comprehensive rehabilitation program for the post-operative tuberculous patient has been carried out in cooperation with the Chest Service and the Department of Physical Medicine and Rehabilitation, to establish a physiologically sound means of combating residual disabilities. Since all patients were seriously ill with tuberculosis, the intensity and frequency of the therapeutic efforts had to be carried out with extreme caution.

The program has been divided into two distinct phases; pre-and post-operative. During the pre-operative period, the objective is to teach the patient the four basic exercises necessary following surgery. They are 1) to educate and strengthen the synergistic muscles not directly affected by the operative procedure, so that they may take over, as much as possible, the function of the primary muscles which are temporarily disabled by the operative trauma; 2) training in diaphragmatic breathing; 3) positioning in the lying, sitting or standing positions, and 4) other basic exercises for the scapulo-humeral mechanism.

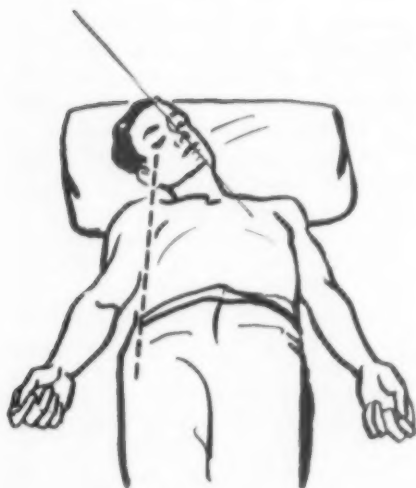
The program should be started at least one week before surgery and be resumed in a progressively graded manner no later than twenty-four hours after surgery. Exercises should be performed twice daily. Starting the exercises early facilitates the job of the physical therapist and lessens the discomfort and pain of the patient, since fibrosis and matting is still slight. Oxygen therapy does not contraindicate the exercise program.

The exercises are divided into 1) passive exercises, when the movements are carried out by the physical therapist; 2) active-assistive, when the pa-

tient participates as much as he can, assisted by the physical therapist to complete the indicated motions; 3) active, when the patient, without any aid, performs the complete exercise series, and 4) active-resistive, when additional exercise load is given the patient to increase muscle power. The exercises are executed with a tilted bed-mirror for the immediate post-operative patient lying in the supine position. For the ambulatory patient a postural mirror is used. Exercise routine used in pre- and post-chest surgery at Bellevue Hospital follows.

Exercise 1

Lying position; emphasize correct bed posture. Level pelvis. Avoid any rotation or "lifting" of one hip. Level shoulders which are held parallel to the level hips. The shoulders must be in normal relaxed position and not elevated. The head, in cases of impending thoracoplasties, is held in position of lateral bending to the operative side. In thoracic surgery other than thoracoplasties, where the scaleni muscles are not severed, the head is held in normal position, in line with the trunk.



Exercise 1 — Basic position.

Exercise 2

Position supine. Patient bends trunk laterally toward non-operative side. He is instructed to breathe diaphragmatically with the "operative" side only. Post-operatively, this exercise is most important in hastening mobilization of the affected side of the diaphragm and helps avoid paradoxical breathing in thoracoplasties. Pulmonary re-expansion in excisional operations is accelerated. This exercise induces the cough reflex, which is of considerable importance in evacuating the pathologic contents of the bronchi.



Exercise 2 — Diaphragmatic breathing.

Exercise 3

Position supine. Active head extension (only in thoracoplasty). Pelvis, shoulders and head are held level. With chin depressed, patient presses head and neck backward for two counts. Relax on count of three. Repeat sequence three times. The objective is to strengthen the primary and synergistic extensors of the head and cervical spine (upper fibers of trapezius, splenius, longus colli, etc.).



Exercise 3 — Active head extension.

Exercise 4

Active shift of head to operative side (only in thoracoplasty). Head is moved laterally to one side only. The head, held at right angles to the body is slid to the operative side for two counts and returned to normal position on a count of three. Repeat sequence three times. Since, in thoracoplasties, the scalenus groups will be permanently sectioned, the corresponding group of the unoperated side will tend to form contractures, thereby deviating and rotating the upper spine. By stretching these muscles and also by strengthening the synergists of the affected scaleni, these potential deformities are anticipated and may be greatly limited.



Exercise 4 — Active shift of head.



Exercise 5 — Adduction and depression of the scapula.

Exercise 5

Position supine. Active adduction and depression of scapula (unilateral). Therapist places his hand under the scapula. Patient is now instructed to press backward medially and downward

on the supporting hand. The patient is taught the specific coordinative exercises that will be required post-operatively to restore function of the adductors and depressors of the affected scapula (rhomboids, mid and lower fibers of trapezius, latissimus dorsi, etc.). This exercise stretches the pectoralis muscles, and combats any tendency to forward rotation of the shoulder. Repeat three times holding for count of three with rest periods of three seconds between exercises.

Exercise 6

Position supine. Active assistive depression of "affected" shoulder girdle. Forearm is flexed on upper arm, fingers on shoulder. Arm held at side of trunk. Therapist "fixes" shoulder girdle and flexed elbow joint with his fingers. Patient depresses the flexed arm downward, stretching the shoulder capsule, ligaments, and muscles. Hold for two counts. Relax to normal position (do not raise shoulder above normal level) on count of three. Repeat three times. Muscles of the shoulder girdle (lattissimus, lower fibers of trapezius, pectoralis, etc.) are stretched and strengthened. Post-operative "high shoulder" is prevented.

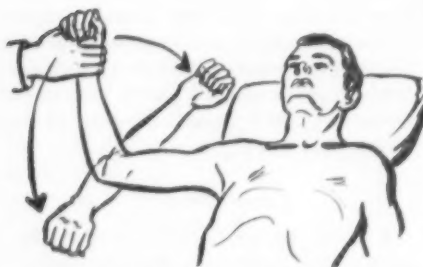


Exercise 6 — Depression of shoulder girdle.

Exercises 7 and 8

Position supine. External and internal rotation of the shoulder joint. Therapist swings arm to maximum abduction; arm is rotated at first externally, and then internally. Again the patient is encouraged to carry out these exercises to the point of tolerance. The therapist sup-

plies the degree of assistance indicated. Repeat three times with rest period. Maximum mobilization of the joint is assured and rehabilitation of the muscles of the shoulder is hastened.



Exercises 7 and 8 — External — internal rotation.

Exercise 9

Position supine. Active assistive "horizontal" abduction and adduction of arm (unilateral). Arm is flexed at elbow and abducted to ninety degrees if possible—if not, as close as possible. The therapist supports the flexed arm the same as in exercises 7 and 8. The object of this exercise is to stretch the post-operative adhesions, and to exercise the adductors of the scapula and the extensors of the arm during the abduction phase of this procedure. Frequency and time intervals are the same as in previous exercises. The flexed arm is carried medially, striving to touch the opposite shoulder with the fingers.



Exercise 9 — Horizontal abduction — adduction.



Exercise 10 — Flexion of arms.

Exercise 10

Position supine. Active assistive elevation (flexion) of both arms. Patient clasps hands with arms extended and resting on trunk. He is instructed to elevate the arms slowly overhead to the point of tolerance. Because of pain, this movement may be quite limited in the early post-operative stage. Mobilization of the shoulder joint and exercise of the muscles of the shoulder girdle and arm is achieved. Repeat three times with customary rest periods.

Throughout these exercises, it is essential to watch for substitution movements, such as elevation of the scapula, forward rotation of the shoulder, etc. It is desirable to adhere to physiologically normal joint movements.

The pre- and post-operative routine is diligently carried out in the lying posi-

tion for one week. If the condition of the patient permits, he is seated in front of a full-length posture mirror and the rehabilitation routine is continued.

Exercise 11

Active unilateral flexion of head (only in case of thoracoplasty). Position: sitting with pelvis, shoulders and head level. Patient bends the head to the "affected" side, aiming to touch the ear to the shoulder. Avoid rotation of head. Hold for count of three. Repeat sequence three times. The residual flexors of the affected side are strengthened and those of the symmetrical (unoperated) side are stretched.



Exercise 11 — Flexion of head.

Exercise 12

Active circumduction of both shoulders. Position sitting—with arms flexed at elbows and held at sides of body, finger tips at shoulders. Patient carries flexed arms forward upward to right angles with the trunk; arms are abducted horizontally winging out to the sides of the body. Return to starting position.

Repeat sequence three times with necessary rest periods. The shoulder joints are kept mobile and the matted soft tissues are stretched. If the patient finds this exercise too taxing, limit the procedure to the affected shoulder only.



Exercise 12 — Circumduction of shoulders.

Exercise 13

Abduction and adduction of flexed arms. Starting position—hands clasped back of neck, flexed arms winged at sides, shoulder high. Patient adducts flexed arms touching elbows at front of body, then carries arms horizontally back to original position. Repeat sequence three times with usual intervals of rest. This exercise stretches the post-operative matted soft tissues and primarily activates the adductors of the scapula.

Exercise 14

Adduction and depression of scapula. Basic position—hands clasped over umbilicus, arms at sides, and shoulders depressed. Patient is instructed to approximate the scapulae by contracting the ad-



Exercise 13 — Abduction — adduction of flexed arms.

Exercise 14 — Adduction — depression of scapula.



Exercise 15 — Flexion—extension of the trunk.

ductor muscles. Repeat three times with rest intervals. The adductors of the scapula are strengthened and the pectorals are stretched.

Exercise 15

Flexion and extension of the trunk. Starting position — sitting erect, arms hanging loosely at sides, knees together. Patient slowly lowers trunk until head touches knees and hands reach floor. This exercise results in mobilization of the spine and further stretching of the matted tissues.



Exercise 15 — Flexion of arms.

Exercise 16

Repetition of exercise 10 executed in the basic sitting position.

Exercise 17

Because of the relatively strenuous nature of this procedure, it should not be utilized until the patient has regained maximum strength and vitality. With the patient in sitting position, forearm at right angles to upper arm and supinated, the patient holds the flexed arm posteriorly while the therapist applies resistance against the elbow. Return to starting position. Repeat three times with rest periods. This exercise excessively develops the pectoralis minor in an effort to fill in the post-operative cavitation of the upper part of the anterior aspect of the chest wall.



Exercise 17 — Resistive.



Fig. 1 — Plombage thoracoplasty.

Comment

During the past five years a planned rehabilitation program has been carried out at Bellevue Hospital. This program was a joint project of the Department of Physical Medicine and Rehabilitation, and the Chest Service, for patients scheduled for thoracic surgery.

Observations are based on 1,200 patients with surgery such as thoracoplasty from seven to ten ribs; plombage thoracoplasty, and resectional surgery with or without concomitant thoracoplasty.

As a part of this general survey, a special study was conducted to establish the value of therapeutic exercises. Patients with extensive thoracoplasty from seven to eight ribs were selected for the exercise series. This surgical procedure often causes malfunction of the joint and skeletal deformities. Two groups, twenty-one patients in each, were chosen; the experimental group participated in the rehabilitation program at Bellevue Hospital; the control-group, selected from the Chest O.P.D., received no therapeutic exercises.

Although it is difficult to match tuberculous patients, emphasis on similarity of age, sex, seat of lesion or lesions, and surgical procedure was made. Both groups were composed of 18 males and 13 females between the ages of 20 and 45 years. All had seven to eight ribs thoracoplasty. Five had transverse process resection. In the experimental group,

the oldest thoracoplasty was performed four years ago; the most recent thoracoplasty was performed two years ago. In the control group, the oldest thoracoplasty was performed fifteen years ago and the most recent one two years ago. Both groups are still under clinical follow-up at Bellevue Hospital and are controlled every three to six months.

In the experimental group, all but one have complete range of motion. The one patient in question suffered from a sub-deltoid bursitis and was treated with ultrasound and novocain infiltrations. Results were unsatisfactory. In the control group, only three patients have complete range of motion whereas fifteen have limitations varying between 20 and 40 degrees. Three have completely frozen shoulders and four developed shifting of the mediastinum resulting in serious cardiorespiratory disturbance.

We feel, contrary to the belief that scoliotic deformities may develop after some months or years, such deformities really develop in the immediate post-operative period, whereas fibrotic ankylosis of the shoulder joint in patients who did not perform post-operative exercises, appears later.

It is a fact that the most intelligently applied exercises cannot prevent scoliotic deformity in some cases and in particular with thoracoplasty. However, comparison between the aforementioned two groups shows that remedial exercises are an important phase and should be included in the present-day treatment (table 1).

Table 1: Breakdown Figures on Scoliotic Deformities

	Experimental group	Control group
Less than 5°.....	16	0
Between 5°-10°.....	4	0
Between 10°-15°.....	1	0
Between 15°-20°.....	0	12
Between 20°-25°.....	0	6
Between 25°-30°.....	0	3
TOTAL	21	21

It is to be further emphasized that these exercises should not be discontinued after patients have been discharged. They should be continued for months, if not for years. Educating the patient in technique of the exercises is not enough; it is important that he be instructed that regularity is paramount.



Fig. 2 — Thoracoplasty without therapeutic exercises. Note the shifting of the mediastinum and the scoliotic deformity as pointed out by the arrows.

Summary

In the past five years, a carefully planned routine rehabilitative program for thoracic surgery patients has been carried out at Bellevue Hospital.

The results obtained show that with corrective measures, scoliotic deformity and fibrotic ankylosis can be minimized.

Comparative study of a control-group emphasizes the necessity of intelligently applying these preventive and remedial measures in the present-day treatment.

For reprints, write Dr. Haas, 477 First Ave., New York 16, N. Y.

Acknowledgment — The authors are grateful to Mrs. Marian Marx, R.P.T., for her cooperation, and to Mr. Gabriel Mayorga for the art work.

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Awards of Merit for the Year 1955

The Committee on Gold Key Award presented through its Chairman, Dr. Gordon M. Martin, distinguished service keys to:

WALTER M. SOLOMON, M.D., posthumously, in recognition of the contribution that he made to the advancement of the science and art of physical medicine and rehabilitation through his distinguished career in this field and in the field of rheumatology; through his service as a writer and editor, and through his achievements as a loyal and enthusiastic worker in many offices and on many committees of the organizations associated with physical medicine and rehabilitation; who, by his many accomplishments notably advanced the Science and the Art of Physical Medicine and Rehabilitation.



Walter M. Solomon, M.D.

Doctor Solomon was a native of Michigan. He received his M.D. degree from Western Reserve University in 1934. He was certified by the American Board of Internal Medicine in 1941; in 1947 he became a diplomate of the American Board of Physical Medicine. For twenty years he was in private prac-

tice and served on the staff of Western Reserve Medical School as Assistant Clinical Professor of Medicine. During World War II, he served in the South Pacific for four years. He was awarded the Bronze Star Medal for his work in developing physical medicine services in the South Pacific theater of operations. He served as President of the American Congress of Physical Medicine and Rehabilitation in 1953. In 1954, he joined the consulting staff of the Department of Physical Medicine of the Cleveland Clinic. He received a citation from the President of the United States, Dwight D. Eisenhower, in 1954 for his work in rehabilitation in Ohio. Also, in 1954, he was Chairman of the Section on Physical Medicine and Rehabilitation of the American Medical Association.

ROBERT L. BENNETT, M.D., Warm Springs, Georgia, in recognition of the contribution that he has made to the advancement of the science and art of physical medicine and rehabilitation through his untiring efforts to achieve a continually higher standard of care for victims of poliomyelitis; through his zeal to impart to others the knowledge he has gained from long experience, and through his emphasis on the necessity of attention to detail in the evaluation and treatment of residual disabilities and potential deformities in order to provide maximal improvement and permit maximal rehabilitation; who, by his many accomplishments has notably advanced the Science and the Art of Physical Medicine and Rehabilitation.

Doctor Bennett is a native of Pennsylvania. He received his M.D. degree from the University of Pittsburgh in 1936. In 1940, he received a Master of Science degree in physical medicine from the Mayo Foundation of the University of Minnesota. He was certified by the American Board of Physical Medicine in 1947. He is Director of Physical Medicine and Medical Director of the Georgia



Robert L. Bennett, M.D.



Earl C. Elkins, M.D.

Warm Springs Foundation as well as Professor of Physical Medicine at Emory University. He serves as consultant in physical medicine and rehabilitation to the Veterans Administration and Office of the Surgeon General of the U.S. Army. He was President of the American Congress of Physical Medicine in 1952. He is now Chairman of the American Board of Physical Medicine and Rehabilitation.

EARL C. ELKINS, M.D., Rochester, Minnesota, in recognition of the contribution that he has made to the advancement of the science and art of physical medicine and rehabilitation through his sincere efforts to maintain high educational, ethical and professional standards in this field; through his fine example of untiring and devoted service to his patients, and through his pioneering development of an outstanding private hospital service of physical medicine and rehabilitation; who, by his many accomplishments has notably advanced the Science and the Art of Physical Medicine and Rehabilitation.

Doctor Elkins is a native of South Dakota. He received his M.D. degree from George Washington University in 1933. He was a Fellow of Physical Medicine at the Mayo Foundation, Univers-

ity of Minnesota, from 1935 to 1939. He was certified by the American Board of Physical Medicine in 1947. He is a consultant in physical medicine and rehabilitation at the Mayo Clinic and holds the rank of Associate Professor of Physical Medicine at the University of Minnesota. He is medical director of the School of Physical Therapy at Mayo Clinic. He served as President of the American Congress of Physical Medicine in 1949 and is now Chairman of the Editorial Board of the *ARCHIVES OF PHYSICAL MEDICINE AND REHABILITATION*; Chairman of the Board of the American Registry of Physical Therapists, and Secretary-Treasurer of the American Board of Physical Medicine and Rehabilitation.

Awards to Scientific Exhibitors

The Committee on Awards for Scientific Exhibits presented through its Chairman, Dr. Louis B. Newman, the following:

Gold Medal to Harry T. Zankel, M.D.; Richard Clark, B.S., and Reginald Shipley, M.D., for the exhibit "Venous Circulation Studies of the Lower Extremity Using a Radioactive Tracer."

Silver Medal to Robert L. Bennett, M.D., for the exhibit "Classification of

Early Paralytic Scoliosis."

Bronze Medal to Khalil G. Wakim, M.D., and Frank H. Krusen, M.D., for the exhibit "Effects of Electric Stimulation on Denervation Atrophy."

Honorable Mention to Maxwell D. Flank, M.D.; Erma A. Smith, M.D.; James F. Kurtz, M.D., and Raymond J. O'Brien, M.D. for the exhibit "Lower Extremity—Temporary Training Prostheses (Pylon)."

Essay Award

The Committee on Prize Lecture, presented through its Chairman, Dr. Frederic T. Jung, the award to:

SHYH-JONG YUE, M.D., of New York City for his paper "Arthroplasty of the Hip, Its Pre-and-Post-Operative Management." Dr. Yue was graduated from the National Medical College of Shanghai, China in 1938. After graduation, he received training in general surgery in China for a period of five years. During World War II, he served as a Leader of Surgical Units in the Chinese Expeditionary Forces in the Burma Campaign. In the United States, he served an orthopedic residency at the Hospital for Special Surgery in New



Shyh-Jong Yue, M.D.

York; a residency in physical medicine and rehabilitation at the New York State Rehabilitation Hospital, West Haverstraw, and as a Baruch Fellow in the Department of Physical Medicine and Rehabilitation at the Columbia-Presbyterian Medical Center. He is now serving as a Fellow in the Department of Physical Medicine and Rehabilitation at the College of Physicians and Surgeons, Columbia University and as a Training Fellow at the Institute for the Crippled and Disabled in New York City.

PHYSICAL MEDICINE ABSTRACTS

The Significance of Clinical Tests of Passive Joint Sense. J. Lee, and K. Browne. *Lancet* II:56 (July 9) 1955.

The findings of some experimental work on proprioceptive sensibility (published in another paper) are brought to the attention of the clinician because of their importance as a routine neurological test. The first metatarsophalangeal joint was studied for its proprioceptive sense when moved passively. The investigation had shown that when moved at speeds of rotation of 1 degree and 2 degrees per second, the first metatarsophalangeal joint only registered joint sense after 4.4 degrees in an average of 82 subjects. In 10 of the subjects it was 15 degrees and in 3 no movement was felt until an angle of more than 20 degrees downwards had been traversed. This is close to the limit of downward movement, and it is possible that the sensation is from distortion of extra-articular structures.

In the routine neurological test four points merit criticism:

1. The method of gripping the toe. The grip on the sides recommended in most textbooks produces more distortion on extra-articular structures than the grip from above and below the phalanx.
2. The angle through which the toe is moved is so large that almost invariably it produces extra-articular distortion.
3. The mode of questioning usually allows a 50 per cent chance of getting the correct answer.
4. The failure to distinguish between active and passive movement.

Experimental evidence suggests that proprioceptive sensibility produced passively probably arises from the capsule of the joint, and if this is tight as in hallux rigidus, the proprioceptive sensibility is more acutely sensitive to passive motion. Proprioceptive sensation produced by active motion depends chiefly on muscles and tendons and is much more accurate.

It would appear from the evidence presented that testing proprioceptive sensation of

joints by passive motion at the first metatarsophalangeal joint gives no reliable evidence of neurological changes.

Five Years Experience with a High Humidity Room. Harry Baker. *Canad. M.A.J.* 72:914 (June 15) 1955.

One of the recognized phases of treatment of acute laryngotracheo-bronchitis in children is to place the children in an atmosphere that is cool and very highly humidified. A specially constructed room has been built for this purpose in the Children's Hospital at Vancouver at a cost of \$3000. A humidity of 100 per cent and a temperature of 70 to 72 F., are maintained. The room holds four beds and although the cost would be less for four individual humidifying units, the author believes that the ease of nursing and the freedom from the sense of confinement outweigh the disadvantages. One hundred forty cases of acute laryngotracheo-bronchitis have been treated in the high humidity room with no tracheotomies and no fatalities. Three hundred other respiratory cases, e.g., pneumonia, asthma, bronchitis and postoperative stridor have all been treated here and responded well. Pediatricians in charge of these cases believed that the use of the highly humidified room eliminated the necessity to perform many tracheotomies. Dehydrated infants also responded much better to treatment in this atmosphere.

The Incidence of Leukemia in Ankylosing Spondylitis Treated with X-rays. W. M. Court Brown, and J. D. Abbott. *Lancet* I:1283 (June 25) 1955.

This paper is a preliminary report of an inquiry into the possible cause and association of leukemia in patients with ankylosing spondylitis who have been treated with x-ray.

A series of 9364 patients treated from 1940 to 1954, inclusively, has been analyzed and the expected number of deaths from leukemia

in this series has been calculated on the basis of the male age, and specific death rates from leukemia, in England and Wales for 1953. The observed deaths from leukemia were found to be at least five times, and possibly as many as ten times the expected numbers of such deaths. Among those patients given more than one course of x-ray treatment, the observed deaths are probably at least nine times those expected to occur.

There is evidence which suggests that patients with ankylosing spondylitis may be unusually susceptible to the development of leukemia. However, it is likely that the incidence of leukemia is appreciably raised among those patients given more than one course of x-ray treatment.

The findings are critically reviewed in the light of other reports in the medical literature, and it is concluded that some if not the majority of the observed cases of leukemia may be attributable to x-ray irradiation. The authors state that in spite of these findings it would be wrong to withhold x-ray therapy in definite cases of ankylosing spondylitis. However, it is certain that no one should be treated with x-ray unless the diagnosis is absolutely certain, and a second course of x-ray therapy should not be given unless absolutely necessary.

A Simple Posture Meter. R. Harris. *Ann. Rheumat. Dis.* 14(1):90 (Mar.) 1955.

A simple method of recording spinal deformity in ankylosing spondylitis is of value in assessing progress of the disease and the effects of treatment. The apparatus described is cheaper, less cumbersome, more simple and more convenient than those in use at present. Essentially, this consists of a six-foot, three-inch upright wooden post firmly fixed to a flat

wooden base. Through the upright, holes are bored three-sixteenth of one inch diameter and spaced three-inches apart. Into these holes are placed closely fitted wooden rods which vary in length from eighteen-inches at the top to six-inches at the bottom. The patient plows his heels in heel holds in the base and assumes his best posture, with his back against the post. The rods are pushed out until they just touch the spine, the distance they project is measured and the form is then traced on graph paper.

Ankylosing Spondylitis (A Review of 184 Cases). Hart F. Dudley. *Ann. Rheumat. Dis.* 14(1):77 (Mar.) 1955.

One hundred eighty-four patients (18 female, 166 male) were seen with ankylosing spondylitis and of these 73 were followed over a five-year period.

Initial symptoms in 73.4 per cent were pain and/or stiffness in the low back and buttock, although in 31 per cent initial symptoms were related to the peripheral joints. Four cases were misdiagnosed as having had rheumatic fever. Age of onset was from 10 to 51 years. Bony tenderness was often a prominent and important early symptom. A spondylometer was used which measures the spinal movement between two points, usually the sacrum and vertebra prominens. The initial movement was less than 20 degree in 27 per cent of the cases. Initial chest expansion was less than one-inch in nearly 88 cases. Iridocyclitis or iritis was present in 13.5 per cent of cases. The serum proteins showed a low albumin, but high globulin and fibrinogen. Flocculation tests were positive in a proportion of the cases. The changes were similar to those seen in rheumatoid arthritis.

IMPORTANT ANNOUNCEMENT

American Board of Physical Medicine and Rehabilitation

The next examinations for the American Board of Physical Medicine and Rehabilitation will be held in Chicago, June 16 and 17, 1956. The final date for filing applications is February 1, 1956. Applications for eligibility to the examinations should be mailed to the Secretary, Dr. Earl C. Elkins, 200 1st St., S.W., Rochester, Minn.

BOOK REVIEWS

The reviews here published have been prepared by competent authorities and do not necessarily represent the opinions of the American Congress of Physical Medicine and Rehabilitation and/or the American Academy of Physical Medicine and Rehabilitation.

CARDIAC INJURY RESULTING FROM EFFORT OR TRAUMA: Clinical and Legal Aspects. By *Ernst P. Boas, M.D.* Paper. Price, \$3.00. Pp. 113. Edwards Brothers, Inc., 1745 S. State St., Ann Arbor, Michigan, 1955.

Effort, exertion and trauma are frequently associated with the immediate effects of diseases of the heart. Dr. Boas has written a monograph which reports specific cases and is designed to establish guides that may be of value in studying the relationship between a cardiac lesion and specific trauma.

The author reports 133 cases that are numbered consecutively through nine chapters. The problem of compensation for cardiac injury is present in each case and numerous and varied circumstances are noted in each report. The material is presented without illustrations. There is a bibliography, and the material is well summarized in the final chapter. Cardiac Lesions, resulting from penetrating wounds of the chest, are not considered in the study.

Because of the frequency of heart disease, and the relationship to effort or trauma, this monograph will be of interest to every physician.

THE DIGITAL CIRCULATION. By *Milton Mendlowitz, M.D.* Cloth. Price, \$6.75. Pp. 182, with 60 illustrations. Grune & Stratton, Inc., 381 Fourth Ave., New York 16, 1954.

Here is a most interesting and valuable monograph. It should be most valuable to any physiatrist or to anyone who is even slightly interested in the vascular system. As stated in the preface, the digital circulation may mirror changes that take place in the systemic circulation as a whole. The fact that the circulation in the fingers and toes may be studied easily with comparatively simple bloodless methods entailing little discomfort is of great value to the patient and to the diagnostician.

CHAPTER I—Anatomy. The circulation to the hand and to the foot is described and the microscopic anastomoses are illustrated.

CHAPTER II—Physiology. There is an enormous variation in the normal blood flow through the finger and toe. The blood pressure is measured. The effect of the sympathetic nervous system upon the peripheral vessels is defined along with humoral controls. The effects of hyperoxemia and anoxemia, of emotions, of heat and cold and of posture are all discussed.

CHAPTER III—Pharmacology. Here long lists of blocking drugs are given in a table with the site of action, the part involved, the dosage, the duration of effect and the major side action.

CHAPTER IV—Pathology. This, with the chapters to follow, discusses pathology of the peripheral vascular diseases. Definite methods are discussed, such as, capillaroscopy, blood pressure, blood flow and pulse waves, digital vascular resistance and intravascular blood viscosity, oxygen exchange.

CHAPTER VII—Clubbing. Acquired symmetrical clubbing of the fingers and toes is usually associated with an increase in blood flow in the fingertips. This is usually caused by an increase in the arterial pressure in the digital arteries, the brachial arterial pressure being unaffected. The clubbing, itself, consists largely of hypertrophy and hyperplasia and possibly some congestion and edema of the soft tissues of the fingertips, including the nailbed. Hypertrophic osteoarthropathy is an extension of the process of clubbing to more proximal tissues, especially the periosteum of long bones. Unilateral clubbing is usually produced by brachial, axillary, innominate, or subclavian arterial aneurysm and is often complicated by intra-arterial thrombosis, venous obstruction and thrombosis, and sympathetic nerve irritation, as well as destruction by pressure and by sensory and motor nerve pressure effects. One may therefore tentatively conclude that all forms of clubbing may eventually be found to be caused by local over-supply of blood brought about

by various mechanisms, acting singly or in combinations.

CHAPTER VIII—Hypertension, Sympathectomy, and Coronary Occlusion. The effects of these upon the peripheral circulation are described. Chapters IX and X discuss Anemia and Polycythemia, and Miscellaneous Conditions respectively.

A long list of references is given. This is a book which every doctor should own.

DIAGNOSIS AND TREATMENT OF ACUTE PHASE OF POLIOMYELITIS AND ITS COMPLICATIONS. Edited by *Albert G. Bower, M.D.* Cloth. Price, \$6.50. Pp. 257, with 64 illustrations. The Williams & Wilkins Co., Mt. Royal and Guilford Aves., Baltimore 2, 1954.

This small book contains fourteen chapters on the management of the acute phase of poliomyelitis and it is directed to the medical practitioner as an outline of ready references.

The chapter on "Treating of Respiratory Insufficiency" by Dr. Albert G. Bower is excellent and directs attention to the fact that it is not only necessary to provide adequate oxygen intake, but it is necessary to ascertain if the carbon dioxide output is adequate. Any patient who develops such insufficiency of respiration, due to impaired ventilation should have immediate assistance to control this asphyxia. In attempts to correct inadequate gaseous exchange, steps should be taken promptly and before emergency measures are required. He states that oxygen therapy should be used with caution unless the mechanism of breathing is ascertained, and means for mechanical respiratory assistance are at hand.

The chapter on "Differential Diagnosis of Poliomyelitis" describes in detail the different methods of arriving at a diagnosis from other conditions having similar signs and symptoms.

The discussion of "Medical Management of Patients" gives valuable details in the management of various complications that occur during the course of the acute phase of poliomyelitis, including the care of equipment, the bladder, etc.

For relief of muscle pain opiates should never be used. The author advocates the use of Priscoline. Again, such complications as hallucinations, coma, convulsions, etc., might be due to hypopotassemia, or inadequate respiration. Prolonged hyperventilation is the primary cause of convulsion in the respirator patient and may do as much damage as asphyxia. It may be responsible for the death of the patient. The nursing cares and treatment of the poliomyelitis patient with respiratory difficulties are described and good advice on the management of these patients is given.

The chapter on "Physical Medicine in the Treatment of Poliomyelitis," was written by Dr. Elizabeth Austin, who believes that there are five objectives in this field for care of the acute patient. These are (1) to evaluate neuro-muscular involvement; (2) to allay the acute neuro-muscular phenomena of muscular shortening, irritability, stretch pain, and tenderness; (3) to prevent or minimize the musculoskeletal deformities by proper positioning and by supervised motion; (4) to establish patterns of functional motion by neuromuscular re-education so that the patient will make the most effective use of residual power, and (5) to evaluate the ventilation requirements of patients with respiratory impairments so that they may receive breathing assistance before vital centers are damaged by asphyxia, may be maintained in the respirator with adequate ventilation, may be removed judiciously from the respirator without episodes of asphyxia and with the maximum return of respiratory function.

In general this is a concise book giving the fundamentals of treating of the acute phase of poliomyelitis. However, there should be a number of questions raised as to some of the methods used, and some devices are recommended. As, for example, why should a Taylor Brace be prescribed for a patient with poliomyelitis? With the exception of such minor inaccuracies, this is a good program to be followed by the general practitioner in treatment of acute poliomyelitis.

PERIPHERAL NERVE INJURIES. Edited by *H. J. Seddon.* Cloth. Price, \$7.70. Pp. 451, with illustrations. Her Majesty's Stationery Office, PO Box 569, London S.E. 1, England, 1954.

This book is a detailed report of the experiences with nerve injuries and their sequelae as evaluated by five Nerve Injury Centers established in Great Britain during World War II. A listing of the ten chapters will give the reader an idea of the vast coverage provided. They are Methods of Investigation; Rates of Regeneration, and Vasomotor and Nutritional Disturbances; Lesions in Continuity, and Nerve Injuries and Fractures; Histopathology; Causalgia; Neurovascular Lesions; Electrical Diagnosis and Electromyography; Factors Influencing Functional Recovery; Results of Nerve Suture; Nerve Grafting, and Open Wounds of the Brachial Plexus.

There are 122 tables and 276 excellent illustrations of graphs, technic, photographs of lesions, and various pathological results. Of great value are individual case reports thoroughly documented and listed in different tables for easy study and analysis. The follow-up studies add materially to the usefulness of book.

The book is highly recommended to physicians, and students of physical medicine and rehabilitation, as well as to physical therapists, neurologists, and neurosurgeons.

PSYCHIATRY AND COMMON SENSE.

By C. S. Bluemel, M.D. Cloth. Price, \$3.00. Pp. 259. The Macmillan Co., 60 Fifth Ave., New York 11, 1954.

This book discusses the differences in organization of people. Though they may look and seem very much alike, people differ in their emotional lives and in the adjustments they make to daily living. Those who are poorly organized are subject to functional disorders. This is clearly discussed in the chapters on non-organization and disorganization. Securely organized people are immune from neurotic disturbances. The major factors which determine the quality of the or-

ganization in any individual are heredity, the culture into which one is born and the stresses under which one is subject (situational, emotional, physiological or even unconscious). The common emotional disorders and psychoses are discussed as forms of disorganization. The chapter on reorganization points out how, after honest self-appraisal, an understanding of both assets and failings is necessary to a happier acceptance of life.

This is a well-written and readable book couched in simple language, that can be understood by those not trained in psychiatry. It is intended by the author to help the general reader with his own problems. It might better aid the physician unfamiliar with psychiatry terms or the nurses or therapists and others working with patients in a hospital to understand the problems of patients' adjustment to illness or disability.

MEDICAL NEWS

Members are invited to send to this office items of news of general interest, for example, those relating to society activities, new hospitals, education, etc. Programs should be received at least six weeks before the date of meeting.

Personals

Jerome Weiss, New York City, presented the topic "The Diarrheal Syndrome" at the meeting of the Ohio Academy of General Practice held in Dayton, Ohio on September 20.—The American Medical Writers' Association awarded a fellowship certificate to Archibald P. Hudgins, Charleston, West Va., at its annual meeting held in St. Louis, September 30.—The following Congress members participated in the 38th annual conference of the American Occupational Therapy Association, held in San Francisco on October 22-28: Raoul C. Psaki, S. Malvern Dorinson and Karl E. Carlson.—Edward W. Lowman, New York City was invited to be guest of the dean at the University of Chile medical school at Santiago. Dr. Lowman acted as consultant to the medical school in planning the establishment of a department of physical medicine and rehabilitation.—The Eastern Pennsylvania chapter of the Arthritis and Rheumatism Foundation elected as President Philip R. Trommer of Philadelphia.—Abilities, Inc., has chosen the following as members of the Medical Advisory Committee: Howard A. Rusk, Allen S. Russek

and Samuel S. Sverdluk, all of New York.—Robert L. Bennett, Warm Springs, Ga., discussed the paper "Development of Rehabilitation Facilities," which was part of the symposium on rehabilitation held at the Industrial Health Conference in Houston in September.—"Observations of Metabolic and Anti-rheumatic Effects of Meticorten" was presented by Howard F. Polley, Rochester, Minn., at a symposium preceding the annual meeting of the American Rheumatism Association in Atlantic City.—Frederic J. Kotke, Minneapolis, was keynote speaker on Dr. Sogge Day held at Windom, Minn., in June.—The American Association of Rehabilitation Therapists has a new member in Samuel Sherman of Pittsburgh for its Medical Advisory Board.—The Wisconsin chapter of the AART held a meeting in June at which Ray Piaskoski and Robert W. Boyle delivered addresses.—Frank H. Krusen, Rochester, has been appointed a member of the Minnesota State Board of Health. Dr. Krusen participated in the annual session of the Medical Society of the State of Pennsylvania held in Pittsburgh in September. He spoke on "Physical Medicine and Rehabilitation—Its Significance and Relationship to Other Specialties

in Medicine." Other participants were **Albert A. Martucci** of Philadelphia who chose as his topic "Recent Survey of Physical Medicine and Rehabilitation Facilities in Pennsylvania" and **William H. Schmidt** of Philadelphia who presented the subject "The American Board of Physical Medicine and Rehabilitation—Its Origin and Importance to Hospitals."

New Head of Physical Medicine Department

Dr. David I. Abramson, who has been affiliated with the University of Illinois College of Medicine since 1946, was appointed head of the department of physical medicine and rehabilitation September 1 at the University of Illinois Research and Educational Hospitals. Dr. Abramson, an attending physician at Michael Reese, Mt. Sinai, and Hines Veterans Administration hospitals, is also a consultant in peripheral vascular diseases for the regional office of the Veterans Administration. He formerly taught at the University of Cincinnati and directed cardiovascular research at May Institute for Medical Research in Cincinnati.

Special Courses for Physical Therapists

The U. S. Office of Vocational Rehabilitation is sponsoring a special course for physical therapists at the University of Pennsylvania, School of Auxiliary Medical Services. Interested readers should direct their inquiry to The Division of Physical Therapy, 1818 Lombard St., Philadelphia.

Conference on Electrical Technics in Medicine and Biology

The eighth annual conference will take place at the Shoreham Hotel, in Washington, on November 14-16. This conference has as its purpose the exchange of ideas and greater cooperation among physicians, physiologists, biologists and engineers on matters of mutual interest. The following topics will be presented: "Recent Advances in Angiocardiology," "Audiology and Instrumentation for Hearing," and "Instrumentation in Medicine and Biology."

Rehabilitation Training Program

The Institute for the Crippled and Disabled, New York, announces plans for a second training program to prepare persons in rehabilitation for top-level positions of coordination and administration in rehabilitation centers. The proposed starting date for the seven month course is Dec. 1. Applicants for the course should have had at least three years' experience in some fields of rehabilitation. Trainees will receive a monthly stipend of \$250 for the seven-month period, in addition

to round-trip travel expenses from the institute to the places of on-the-job training. All other expenses will be borne by the trainees. Except in cases of unusual qualification, trainees must be between 30 and 50 years of age. Information may be obtained from the Director, Institute for the Crippled and Disabled, 400 First Ave., New York 10, N.Y.

Home Therapy Service for Arthritic Patients

The Wisconsin chapter of the Arthritis and Rheumatism Foundation has announced the establishment of a nursing and physical therapy service for home-bound patients, in cooperation with the Visiting Nurse Association. Services of the unit, which will be operated by a physical therapist from the Visiting Nurse Association, will be available to patients who are referred by their physician. Dr. Edwin C. Welsh, Milwaukee is in charge of the program. Information may be obtained from the Wisconsin Chapter of the Arthritis and Rheumatism Foundation, 208 E. Wisconsin Ave. (BR 1-4131).

In Memoriam: Joseph E. Malcomson

Commander, U. S. Navy, retired, Detroit; born in Detroit in 1886; Detroit College of Medicine and Surgery, 1917; specialist certified by the American Board of Physical Medicine and Rehabilitation; member of the American Society of Physical Medicine and Rehabilitation; entered the U. S. Navy Sept. 10, 1917, and retired May 1, 1937, for incapacity resulting from an incident of the service; served during World War I with the Navy Transport Service, and during World War II executive medical officer at Great Lakes (Ill.) Training Station and later senior medical officer at Notre Dame (Ind.) University; formerly an officer in charge of recruiting in Detroit and later medical examiner at the Marine Corps Recruiting Station; died July 12, age 68, of cerebral hemorrhage.

FDA Investigation

The Food and Drug Administration of the Department of Health, Education, and Welfare announced that it will hire 48 temporary investigators to carry out a special assignment to enforce the Federal prescription drug law against possible "black market" distribution of the Salk poliomyelitis vaccine.

The activities of the Food and Drug Administration will be carried out in connection with the voluntary plan for allocation of the vaccine announced by the Department under which the States will have responsibility for its intrastate distribution both through commercial and public agency channels.

An appropriation of \$300,000 was made by the 84th Congress to cover the expenses of this special Food and Drug Administration program.

The duties of the 48 special investigators will be to check on the distribution of the vaccine for the purpose of accounting for all of the vaccine which is made or shipped. Such checkups will be considered complete in regard to any particular lot of vaccine when the FDA has a record indicating its total distribution into legal channels; i.e., when it has been determined that the vaccine is in the hands of a physician, a hospital, a State or local health department, or other authorized persons or agencies.

Arrangements have been made with the six licensed producers of the poliomyelitis vaccine whereby they will make available those production and shipping records which are needed to trace and account for each lot of the finished product.

Protocols on lots of vaccine will continue to be submitted to the Division of Biologics Standards of the Public Health Service for review by the Technical Advisory Committee on Poliomyelitis Vaccine which will recommend clearance of the lots to the Surgeon General.

The procedures of the Food and Drug Administration will be confined to assuring that the vaccine is not diverted from legally authorized channels. Under the Federal Food, Drug, and Cosmetic Act, the vaccine is restricted to distribution for use by practitioners who are licensed by the various States to administer such materials. Shipping or dispensing a drug contrary to the provisions of the Act constitutes a violation.

The 48 temporary investigators will carry on their work independent of normal operations of the Food and Drug Administration, but will be selected, trained, and supervised by experienced FDA personnel, and will be assisted by the latter in the investigation of

any instances of apparent maldistribution or other evidence of violation of the law covering prescription drugs. A number of temporary field clerks will also be employed to work on this program.

Requests for Student Medical Care

A bequest of more than \$400,000 from the late Dr. Clarence P. Oberndorf, who left the residue of his estate to Cornell University, "for the psychiatric treatment of students in the university," will in part provide funds to operate the mental health division of the Cornell student medical service. The bequest is the second major gift to the Cornell health service this year. In February a grant of \$450,000 was made by the Gannett Foundation for a campus medical clinic in honor of Frank E. Gannett of Rochester, president of the Gannett Newspapers and a Cornell graduate and trustee.

Rehabilitation of the Blind

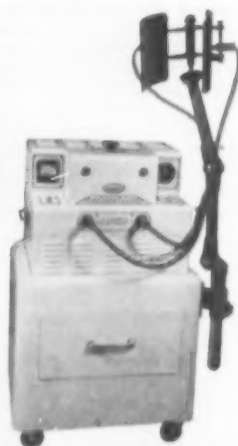
A program of professional training in rehabilitation of the blind, presented at the Industrial Home for the Blind, will offer a twenty-week course for workers entering the following areas of specialization: Rehabilitation counselor; vocational guidance director; vocational instructor; psychologist; physical orientation and foot travel instructor; placement specialist; service stands supervisor; vocational program administrator; and specialist in work for the deaf-blind. There is no tuition fee. A small number of traineeships (\$50 a week) are available. They are intended to cover room, board, and incidental expenses for students whose residence is outside of the New York City area. For information write Mr. Winfield S. Rumsey, Director of Project, Industrial Home for the Blind, 57 Willoughby St., Brooklyn 1, N. Y.



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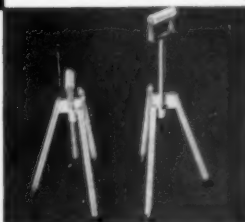
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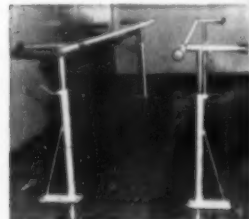
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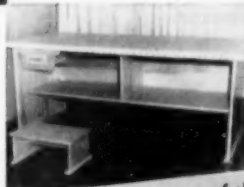
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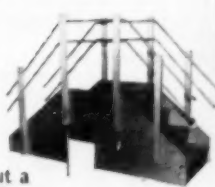


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— Schwan, H.P. and Carstensen, E.L.: J.A.M.A. 149:121 (May 10) 1952

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When the gun failed, they used a tablespoon



H E LEARNED acting the hard way, barnstorming frontier towns (Chicago, pop. 2,000), traveling by barge and stagecoach, playing in sheds, courthouses, taverns.

One night in Houston, a Texan even suggested the troupe tour through Indian country, carrying their stage weapons for protection. Joe Jefferson declined. He later said he had shivered when he imagined himself facing a hostile Indian and armed only with a stage pistol whose tendency to misfire had several times "compelled our heavy villain to commit suicide with a tablespoon."

By the 1860's, Jefferson was America's favorite actor. When he played his famous Rip Van Winkle (see picture), "one-night" towns declared a "Jefferson Holiday." Business stopped, schools closed, so that everyone would get a chance to see him act.

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*Read: Archives of Physical
Medicine & Rehabilitation
May, 1955, pages 282-287

ADVANTAGES

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Model
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Crystal size

12.5 sq. cm.

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*Large area crystal provides uniform distribution
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WANTED—PHYSICAL THERAPISTS: (a) Outstand'g lge clin org; well equip'd dept with variety of cases; lovely Calif city. (b) Vol gen hosp 250 bds; \$450; coll tw 75,000; N.W. (c) Chief; new dept; 300 bd teach'g hosp affil imper med sch; E. (d) Staff; lge univ hosp; lovely city; So. (e) By 10-man clin grp; city 100,000 in drawing area of 500,000; S.W. (f) Two; new 65-bd rehab unit for convalescent children; active OPD; 300 bd teach'g hosp affil lge med sch; univ city; MidE. (g) Consultant; state health dept; plan, org, & direct phys ther prog throust state; \$4800; W. (h) Head dept; 5-6000 patients pr yr; very lge univ affil hosp; Pac N.W. (i) Head dept; 150 bd gen hosp new expand'g to 225; good pure pal; resort city; S.W.

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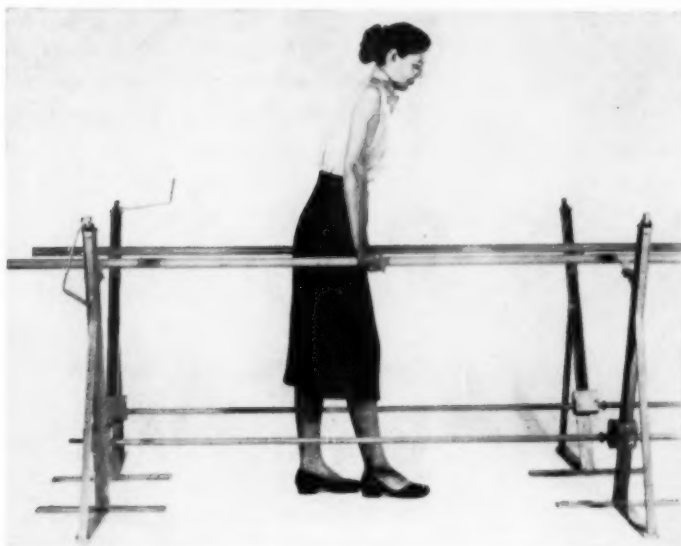
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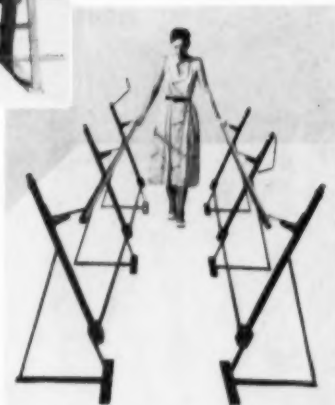
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Of all the hundreds of papers that have been published on the subject of Medical Ultrasonics, one of the most enlightening to the G.P. is the report by another small town General Practitioner, published in the August issue of Medical Times magazine. This paper covers the use of ultrasonic therapy in the treatment of patients who had *previously failed* to respond to other methods. The report includes cases of.

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